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FACTS AND FIGURES 1986 1987

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.
1725 DeSales Street, N.W., Washington, D.C. 20036

$12.95

Compiled by

Economic Data Service
Aerospace Research Center

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Published by

Aviation Week
& Space Technology
A MCGRAW-HILL PUBLICATION

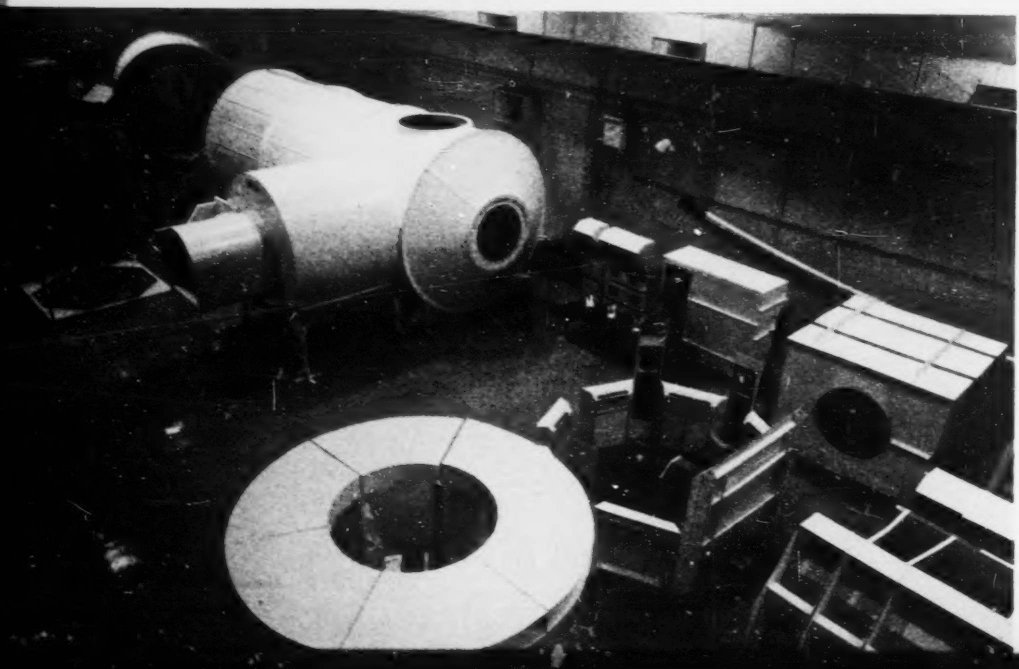
1221 Avenue of the Americas
New York, N.Y. 10020
(212) 512-2123

Copyright, October 1986
by Aerospace Industries Association of America, Inc
Library of Congress Catalog No. 46-25007

Acknowledgments

Air Transport Association of America
Council of Economic Advisers
Export-Import Bank of the United States
Exxon International Company
General Aviation Manufacturers
  Association
International Air Transport Association
International Civil Aviation
  Organization
McGraw-Hill Publications Company
National Aeronautics and Space
  Administration
National Science Foundation
Office of Management and Budget
Price Waterhouse
U.S. Departments of
  Commerce (Bureau of the Census,
    Bureau of Economic Analysis,
    International Trade Administration)
  Defense (Comptroller; Directorate for
    Information, Operations and
    Reports; Army, Navy, Air Force)
  Labor (Bureau of Labor Statistics)
  Transportation (Federal Aviation
    Administration)

High precision, high performance requirements constantly force the aerospace industry to develop improved, leading-edge techniques. The industry's products are the backbone of our air transportation system and our national defense, and they extend our reach into the frontier of space. Aerospace products reflect the industry's technological vitality and the ingenuity and persistence of a dedicated cadre of research professionals. Research and development is the essence, the very pulse of an industry synonymous with flight. Through research and development, aerospace scientists, engineers and technicians discover . . . learn . . . give shape to the future.



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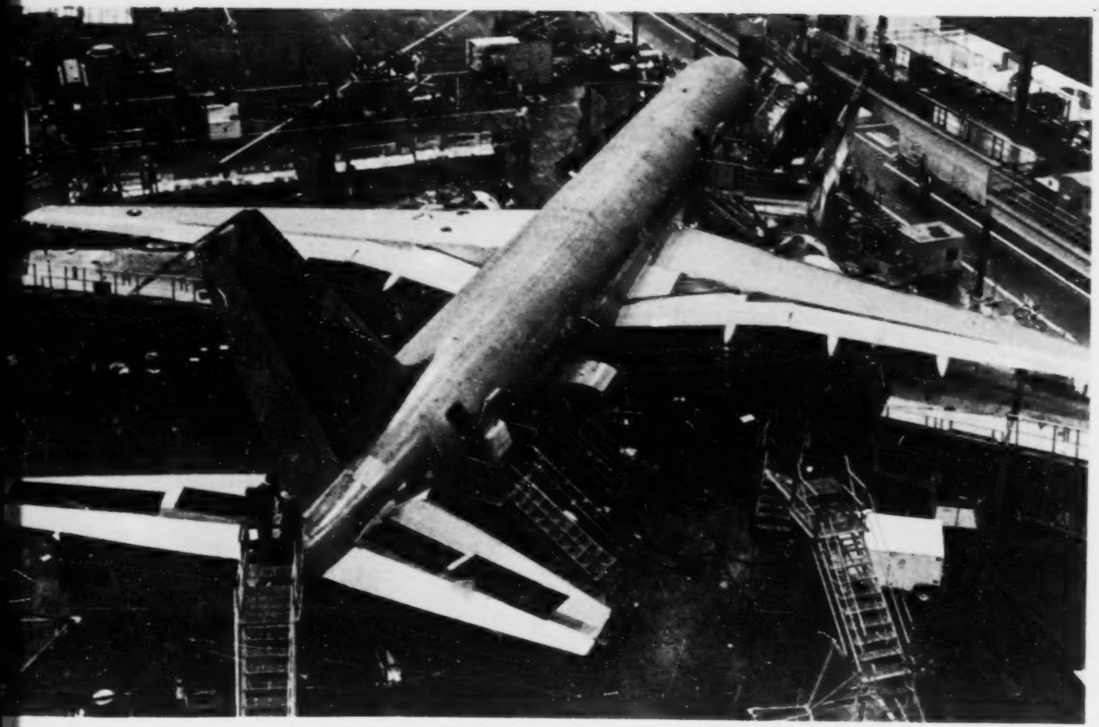


This 34 annual edition of *Aerospace Facts and Figures* chronicles the statistical story of the aerospace industry in the year 1985, a year of robust activity in virtually every category of industry workload. It was a year in which the industry's sales, new orders, backlog and export volume all reached new peaks.

Such peaks are not unusual because dollar values are elevated by inflation, however moderate, coupled with the increased cost of greater performance inherent in high technology products. It has been our practice to provide better perspective by comparing the industry's current performance with that of earlier record years in inflation-adjusted constant dollar terms. On that basis, we find that 1985 sales were higher than those of the previous peak year (1968) by the conversion formula currently employed in this publication but lower by a prior formula. With such inconclusive results, 1985 hardly merits record status, so we will rank it as one of the best sales years in the industry's history.

The industry's profit rate on sales dipped below the previous year's but that is not a matter of particular concern because such year-to-year fluctuations are not uncommon. The 1985 rate of 3.7 percent after taxes exactly matched the rate for all U.S. manufacturing corporations. The average profit rate for the decade of the 1980s remains well above that of the 1970s, an encouraging statistic for an industry whose capital investment needs are of such extraordinary order.

Perhaps more than ever before, the industry's 1985 achievements in the international marketplace underscored the importance to the U.S. economy of high-value, high technology aerospace exports. At a time when the U.S. as a whole recorded the worst international trade deficit in its history, an alarming $136.6 billion, the U.S. aerospace industry set an all-time record for export sales, offsetting to a great extent the lagging U.S. performance in other areas of international trade. Our gratification, however, is tempered by the fact that aerospace *imports* also reached a new record level, concrete evidence that competition from abroad is still growing.

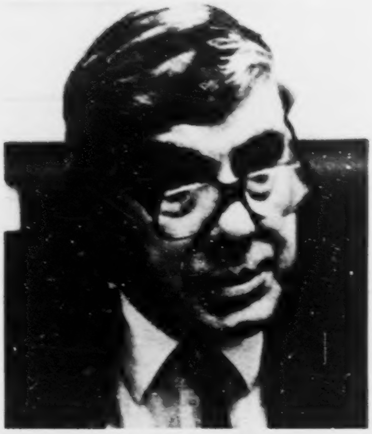
The industry's unprecedented backlog indicates continuing high levels of aerospace

Foreword

activity for the immediate future years. A big factor is the resurgence of commercial transport sales and, with competitive new designs for the 1990s taking shape among commercial airplane builders, we expect continuing strength in that segment of the industry's business.

However, any attempt to project for the long term encounters a mist of uncertainty, because almost two-thirds of the industry's workload is in government contracts and Congressional emphasis on deficit-cutting has had, and probably will continue to have, significant impact on defense and space funding. It is impossible to predict the degree of future impact. Generally, we feel that the widening range of opportunities for space exploitation, together with continuing public support for an adequate system of defense, will result in appropriation levels—hence industry contracts—sufficient to maintain a healthy aerospace workload into the next decade.

Karl G. Harr, Jr.
President
Aerospace Industries Association



air europe
air europe

In 1985, the aerospace industry recorded sales gains in all categories, including civil aircraft, an area that had been sharply depressed in the three prior years. As a result, the industry's total sales increased by almost 16 percent in current dollars. Adjusted for inflation by means of a new conversion formula being used in this publication for the first time, the 1985 sales volume is the highest in the industry's history.

Here is a breakdown of the industry's performance in 1985:

Sales. The industry's total sales amounted to $96.6 billion, up from $83.5 billion in 1984. As is customary, sales of aircraft predominated in the breakdown by product group. At $50.5 billion, aircraft sales were up more than 20 percent over 1984's $41.9 billion and they accounted for well over half of the industry's total sales volume.

As was the case in each of the two preceding years, sales of space systems took second place among the various product groups; they amounted to $18.6 billion, up from $16.3 billion in 1984, an increase of 14 percent. Increases were also recorded in sales of missile systems (up $103 million to $11.4 billion) and in the "related products and services" grouping (up $2.2 billion to $16.1 billion).

Aerospace sales in 1985 represented 2.4 percent of the Gross National Product (up from 2.2 percent in 1984) and 4.1 percent of total sales by all U.S. manufacturing industries (up from 3.7 percent).

Earnings. The industry recorded a profit after taxes of $3.7 billion. In dollar terms, this represented a small gain over the previous year but in percentage terms—whether a percentage of sales, assets or equity—the 1985 profit rate was below that of 1984. As a percentage of sales, it was 3.7 percent, down from 4.1 percent. Expressed as a percentage of assets, the aerospace profit was 4.3 percent, down from 4.7 percent, and as a percentage of equity it was 13.8 percent, down from 14.1 percent. In the latter case (equity), the aerospace figure was higher than the percentage for all U.S. manufacturing industries (10.0 percent) but it was lower as a percentage of assets and exactly equal as a percentage of sales, the most often employed yardstick.

Orders and Backlog. A record flow of

Aerospace Summary

86 87

new orders in 1985 and the highest ever yearend backlog augured continuing high levels of aerospace industry activity. Net new orders received during the year totaled $110.5 billion, up from $104.9 billion at the end of the previous year. Backlog at yearend was $142.8 billion, compared with $132.5 billion at the end of 1984.

The 1985 backlog was composed of $91.8 billion in orders from the U.S. government and $51.0 billion in work for other customers. As is perennially true, orders for aircraft—including engines and parts—constituted the principal element of the backlog, $76.2 billion or more than 53 percent of the total. The aircraft backlog was split evenly, $38.2 billion in government orders, $38.0 billion in orders from other customers. The government figure, primarily orders for military aircraft, increased moderately over 1984 by $1.9 billion, but the "other" orders—largely airline orders for transport aircraft—registered a sharp gain of $4.1 billion.

Civil Aircraft Production. Back in 1978, the number of civil aircraft manufactured by the U.S. aircraft industry reached its peak—18,962 planes. In every year since, the number has dropped, sometimes dramatically. The declining trend continued in 1985 when the industry produced 2,683 aircraft, the lowest number produced in more than 30 years and less than one-seventh the peak year production. The decline in the number of units was due entirely to depressed activity in general aviation plane manufacture; helicopter production remained the same as in the previous year and production of commerical transport aircraft increased substantially.

Despite the numerical decline, dollar value of civil aircraft shipments increased significantly, from $7.7 billion in 1984 to $10.4

billion in 1985, due to increased sales of higher-valued aircraft (airline transports). The sales figure differs from the $13.7 billion shown in the summary tables because it covers only complete aircraft shipments while the larger figure also includes the value of spare engines and parts.

More than 80 percent of the dollar value was in commercial transport sales. The industry delivered 278 jetliners worth $8.5 billion, which compares with 185 aircraft valued at $5.7 billion in 1984. Transport backlog climbed by almost $3 billion during the year; at yearend the industry had orders for 662 transports worth $19.5 billion, up from 489/$16.6 billion at the end of the previous year. The backlog of orders from foreign customers was 252 airplanes worth $7.9 billion.

Although the 376 civil helicopters produced exactly matched the number of units built in the previous year, dollar value was up substantially, from $330 million in 1984 to $505 million in 1985.

Shipments of general aviation planes totaled 2,029 units, 409 fewer than in 1984; this marked the seventh consecutive year of decline in general aviation production. Dollar value also declined, from $1.7 billion in 1984 to $1.4 billion in 1985.

Military Aircraft Production. The industry delivered 930 military aircraft, six fewer than in 1984 and the lowest number since the start of the Reagan Administration's defense expansion program. Dollar value, however, was up. Sales of military aircraft, including engines and parts, amounted to $36.7 billion, compared with $31.2 billion in 1984.

The 930 deliveries included 654 planes retained for service with U.S. military forces and 276 aircraft shipped abroad under Foreign Military Sales (FMS) programs or direct commercial contracts with foreign governments. The 654 U.S. aircraft represented a significant increase over 1984's 561. FMS deliveries increased from 71 units in 1984 to 127 in 1985. Direct export sales decreased sharply, from 304 units in 1984 to 149 in 1985.

Department of Defense outlays for aircraft procurement totaled $26.6 billion in Fiscal Year 1985. The estimate for FY 1986 was $29.5 billion and DoD estimated the same figure for FY 1987 prior to Congressional actions that scaled down the defense budget for that year.

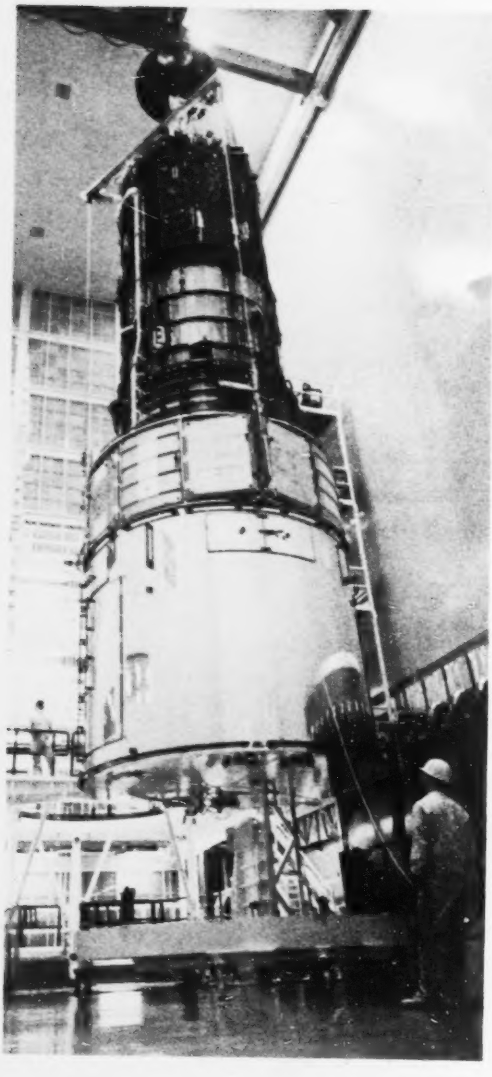
Missile Programs. The $11.4 billion in sales of missile systems, including propulsion units and R&D contracts, constituted a small increase over the 1984 figure of $11.3 billion. However, Bureau of the Census data, which exclude propulsion and R&D, show a larger gain, from $6.1 billion in 1984 to $8.0 billion in 1985.

The flow of new orders for missile systems also increased, but more moderately. New orders—again excluding propulsion and R&D—amounted to $8.0 billion, roughly five percent higher than 1984 orders. Backlog at yearend 1985 was $10.2 billion, compared with $10.0 billion a year earlier.

Space Programs. At $18.6 billion, sales of space systems were up by $2.2 billion over 1984 (the sales figure includes both civil and military space systems, plus R&D work). As has been the case for several years, the increase was due entirely to the rapidly expanding military space program. Department of Defense outlays in FY 1985 were $10.4 billion, compared with $6.6 billion for NASA. The DoD figure represented an increase of $2.4 billion over 1984; adjusted for inflation it amounted to an increase of more than 25 percent. NASA outlays, on the other hand, were essentially at the zero growth level. According to Administration estimates, NASA outlays—in constant dollars—would decline slightly in FY 1986 and 1987, while DoD outlays would increase by about 10 percent in each of those years.

Research and Development. Outlays for U.S. industrial research and development, including both government-funded and company-funded R&D, increased by more than 10 percent to a 1985 total of $79.5 billion, according to the National Science Foundation. The foundation estimated that industrial R&D spending in 1986 would mount by another 9.4 percent to $87 billion.

A separate study by McGraw-Hill Publications Company showed that the aerospace industry, perennial leader among U.S. industries in terms of industrial R&D outlays, once again headed the list with 1985 expenditures of $18.4 billion (combined government/company funding). The firm projected that aerospace would widen its lead in 1986 with outlays of $23.7 billion. McGraw-Hill reported that 1985 aerospace outlays amounted to about 23 percent of all U.S. spending for industrial R&D and that aerospace outlays as a



percentage of the total would increase to more than 26 percent in 1986.

Foreign Trade. In 1985, the United States as a whole experienced its 10th consecutive international trade deficit, which—at $136.6 billion—was the worst in the nation's history. By contrast, the U.S. aerospace industry once again recorded a solid trade balance and set an all-time record for export volume, offsetting to substantial degree U.S. trade losses in other areas.

The aerospace trade balance of $12.6 billion represented a big boost over the previous year's $10.1 billion and was notable for the fact that it was achieved despite the highest-ever volume of aerospace products imported by the U.S. Aerospace exports totaled $18.7 billion, while imports totaled $6.1 billion. Aerospace exports amounted to nine percent of all U.S. exports, the highest figure in 15 years; it compares with 7.1 percent in 1984 and an average for all prior years of the 1980s of 7.5 percent.

The composition of the aerospace export volume was 69 percent civil products and services, 31 percent military, which represents a moderate increase in the civil side of the ratio; in 1984, it was 64 percent civil, 36 percent military. Civil exports gained by more than $3.2 billion, from 1984's $9.7 billion to $12.9 billion in 1985. The principal factor in that gain was a sharp increase in exports of civil transport aircraft after a major decline in the previous year; the industry delivered transports valued at $5.5 billion to foreign customers, a figure that compares with $3.2 billion in the preceding year.

The record aerospace import volume was $1.2 billion higher than the previous (1984) record of $4.9 billion. The gain was almost entirely in civil imports, which totaled $5 billion; military exports, at $1.1 billion, were nearly the same as in 1984.

Employment. At the end of 1985, total aerospace industry employment stood at 1,335,000, the highest level since the peak years of the late 1960s; the figure compares with 1,250,000 at the end of the previous year.

On the annual average basis, 1985 employment was 1,308,000, more than nine percent above the 1984 average. Gains were reported in all major categories, but principally in the segment of the industry manufacturing aircraft, engines and parts, which increased by 51,000 to a total of 647,000 (almost half of the industry's total work force). Employment in the missile/space vehicle fabrication category climbed by 22,000 to 177,000 and there was a gain of 13,000 to 181,000 among employees engaged in production of avionics equipment. Employment increased by 25,000 to a 1985 average of 303,000 in the catchall category that embraces all other aerospace products and services.

The aerospace industry's 1985 payroll was $46.0 billion, compared with $38.7 billion in the previous year; it represented 10 percent of the total payroll of all U.S. manufacturing companies. ☐

STANDARD INDUSTRIAL CLASSIFICATIONS APPLICABLE TO THE AEROSPACE INDUSTRY

3721 **AIRCRAFT**

37211	Complete Aircraft, Military Type
37212	Complete Aircraft, Personal & Utility Type
37213	Complete Aircraft, Commercial Transport Type
37214	Modifications, Conversions, Overhaul of Aircraft
37216	Other Aeronautical Services on Aircraft

3724 **AIRCRAFT ENGINES AND ENGINE PARTS**

37241	Aircraft Engines for U.S. Military Customers
37242	Aircraft Engines for Other than U.S. Military
37243	Aeronautical Services on Aircraft Engines
37244	Aircraft Engine Parts and Accessories

3728 **AIRCRAFT PARTS AND AUXILIARY EQUIPMENT, NEC**

37281	Aircraft Parts & Accessories, NEC
37283	Research and Development on Aircraft Parts
37285	Aircraft Propellers and Parts

3761 **GUIDED MISSILES AND SPACE VEHICLES**

37611	Missile Systems, Excluding Propulsion
37612	Space Vehicle Systems, Excluding Propulsion
37613	Research & Development on Complete Missiles
37614	Research & Development on Complete Space Vehicles
37615	All Other Services on Complete Missiles & Space Vehicles

3764 **SPACE PROPULSION UNITS AND PARTS**

37645	Complete Missile or Space Vehicle Engines and/or Propulsion Units
37646	Research and Development on Complete Missile or Space Vehicle Engines and/or Propulsion Units
37647	All Other Services on Complete Missile or Space Vehicle Engines and/or Propulsion Units
37648	Missile and Space Vehicle Engine and/or Propulsion Unit Parts and Accessories

3769 **SPACE VEHICLE EQUIPMENT, NEC**

37692	Missile & Space Vehicle Parts & Subassemblies, NEC
37694	Research & Development on Missile & Space Vehicle Parts & Components, NEC

3662 **RADIO AND TELEVISION COMMUNICATION EQUIPMENT**

36621	Communication Systems and Equipment, Including Space Satellite Communications Systems
36625	Search & Detection Systems and Navigation and Guidance Systems & Equipment
36629	Electronic Systems and Equipment NEC, including Electronic Trainers and Simulators

3811 **ENGINEERING AND SCIENTIFIC INSTRUMENTS**

38111	Aeronautical, Nautical, and Navigational Instrumens, except Aircraft Engine Instruments

3829 **MEASURING AND CONTROLLING DEVICES**

38291	Aircraft Engine Instruments except Flight

Source: U.S. Government Office of Management and Budget, *Standard Industrial Classification Manual, 1972* (incorporating revisions from the 1977 Supplement).

NOTE: The Standard Industrial Classification (SIC) is a system developed by the U.S. Government to define the industrial composition of the economy, facilitating comparability of statistics. It is revised periodically to reflect the changing industrial composition of the economy.

NEC: Not elsewhere classified

AEROSPACE INDUSTRY SALES BY CUSTOMER

Calendar Years 1971-1985
(Millions of Dollars)

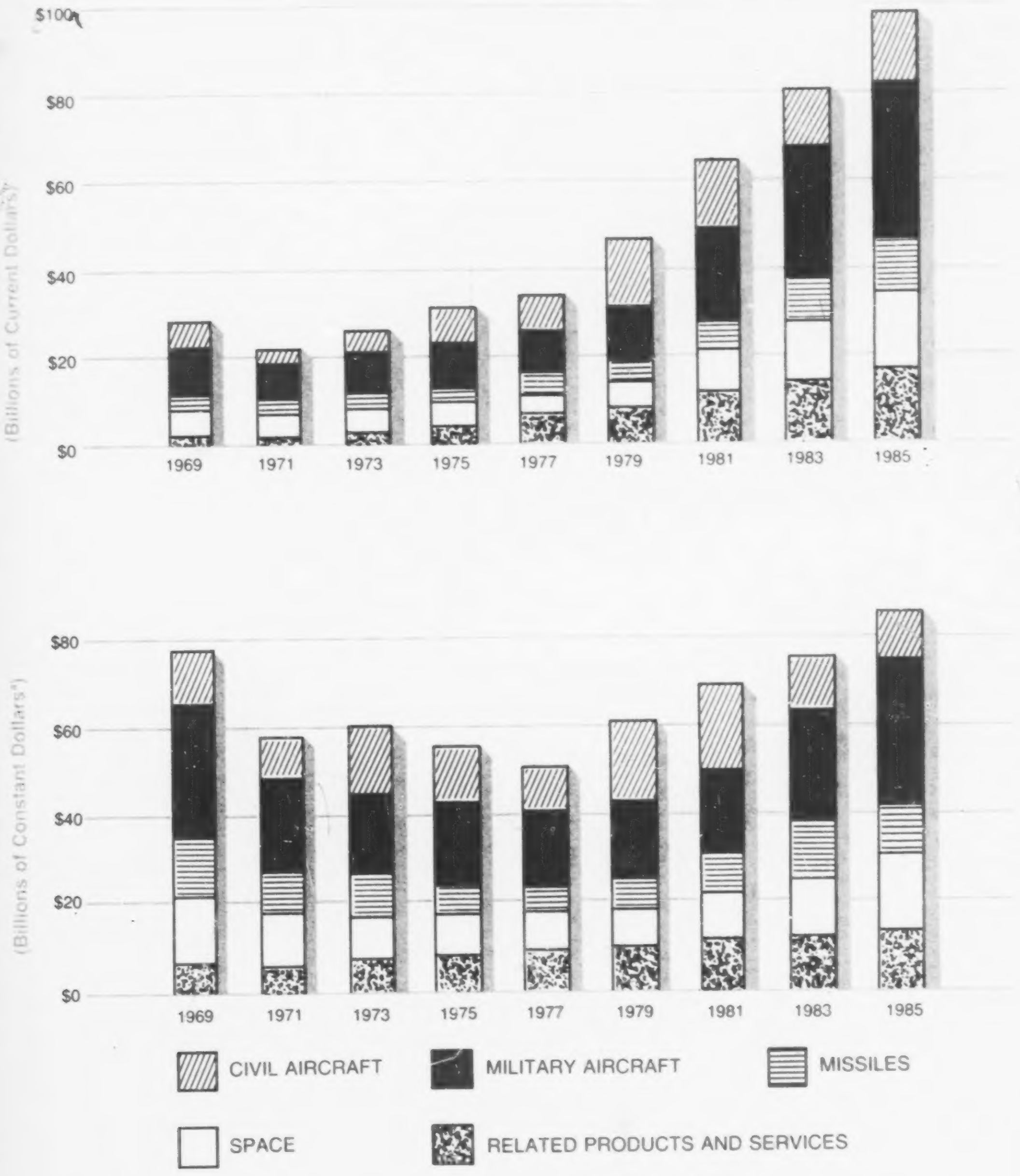
Year	TOTAL SALES	Aerospace Products and Services				Related Products and Services
		Total	U.S. Government		Other Customers	
			Dept. of Defense	NASA and Other Agencies		
CURRENT DOLLARS						
1971	$22,775	$20,252	$12,588	$2,779	$ 4,885	$2,523
1972	23,610	20,964	13,293	2,649	5,022	2,646
1973	25,837	22,494	12,939	2,459	7,096	3,343
1974	27,454	23,387	12,638	2,608	8,141	4,067
1975	29,686	24,894	13,125	2,838	8,931	4,792
1976	29,825	24,514	13,403	2,938	8,173	5,311
1977	32,199	26,095	14,368	3,012	8,715	6,104
1978	37,702	30,889	15,533	3,151	12,205	6,813
1979	45,420	37,705	18,918	3,453	15,334	7,715
1980	54,697	45,878	22,795	4,106	18,977	8,819
1981	63,974	53,090	27,244	4,709	21,137	10,884
1982	67,756	56,366	34,016	4,899	17,451	11,390
1983	79,975	66,646	41,558	5,910	19,178	13,329
1984	83,486	69,572	45,969	6,063	17,540	13,914
1985	96,571	80,476	53,178	6,262	21,036	16,095
CONSTANT DOLLARS (Aerospace Composite Price Deflator, 1982 = 100)						
1971	$59,934	$53,295	$33,127	$7,313	$12,855	$6,639
1972	61,484	54,593	34,617	6,898	13,078	6,891
1973	60,226	52,434	30,161	5,732	16,541	7,792
1974	58,165	49,548	26,775	5,525	17,248	8,617
1975	56,011	46,970	24,764	5,355	16,851	9,041
1976	51,422	42,265	23,109	5,065	14,091	9,157
1977	51,850	42,021	23,137	4,850	14,034	9,829
1978	57,648	47,231	23,751	4,818	18,662	10,417
1979	62,822	52,151	26,166	4,776	21,209	10,671
1980	68,116	57,133	28,387	5,113	23,633	10,983
1981	70,768	58,728	30,137	5,209	23,382	12,040
1982	67,756	56,366	34,016	4,899	17,451	11,390
1983	76,239	63,533	39,617	5,634	18,282	12,706
1984	76,733	63,945	42,251	5,573	16,121	12,788
1985	87,872	73,227	48,388	5,698	19,141	14,645

Source: Aerospace Industries Association.

NOTE: See Glossary for explanation of "Aerospace Industry," "Aerospace Sales," "Other Customers," and "Related Products and Services."

A comprehensive revision of the AIA aerospace industry sales series for 1967-1984 was completed in 1985 in order to incorporate different data sources and estimating procedures selected to better reflect the evolving composition of the aerospace industry.

AEROSPACE SALES BY PRODUCT GROUP



Source: Aerospace Industries Association

[a] Based on revised aerospace composite price deflator (1982 = 100)

AEROSPACE INDUSTRY SALES BY PRODUCT GROUP

Calendar Years 1971-1985
(Millions of Dollars)

Year	TOTAL SALES	Aircraft			Missiles	Space	Related Products & Services
		Total	Civil	Military			
CURRENT DOLLARS							
1971	$22,775	$12,213	$ 3,764	$ 8,449	$ 3,678	$ 4,361	$ 2,523
1972	23,610	12,516	4,181	8,335	4,285	4,163	2,646
1973	25,837	14,144	5,742	8,402	4,224	4,126	3,343
1974	27,454	14,867	6,320	8,547	4,108	4,412	4,067
1975	29,686	16,433	6,463	9,970	3,775	4,686	4,792
1976	29,825	16,056	6,007	10,049	3,671	4,787	5,311
1977	32,199	16,988	6,183	10,805	4,106	5,001	6,104
1978	37,702	21,074	8,222	12,852	4,098	5,717	6,813
1979	45,420	26,382	13,227	13,155	4,778	6,545	7,715
1980	54,697	31,464	16,285	15,179	6,469	7,945	8,819
1981	63,974	36,062	16,427	19,635	7,640	9,388	10,884
1982	67,756	35,484	10,982	24,502	10,368	10,514	11,390
1983	79,975	42,431	12,373	30,058	10,269	13,946	13,329
1984	83,486	41,905	10,690	31,215	11,335	16,332	13,914
1985	96,571	50,482	13,730	36,752	11,438	18,556	16,095
CONSTANT DOLLARS (Aerospace Composite Price Deflator, 1982 = 100)							
1971	$59,934	$32,139	$ 9,905	$22,234	$ 9,679	$11,476	$ 6,639
1972	61,484	32,594	10,888	21,706	11,159	10,841	6,891
1973	60,226	32,970	13,385	19,585	9,846	9,618	7,792
1974	58,165	31,498	13,390	18,108	8,703	9,347	8,617
1975	56,011	31,005	12,194	18,811	7,123	8,842	9,041
1976	51,422	27,683	10,357	17,326	6,329	8,253	9,157
1977	51,850	27,356	9,957	17,399	6,612	8,053	9,829
1978	57,648	32,223	12,572	19,651	6,266	8,742	10,417
1979	62,822	36,490	18,295	18,195	6,609	9,052	10,671
1980	68,116	39,183	20,280	18,903	8,056	9,894	10,983
1981	70,768	39,891	18,171	21,720	8,451	10,385	12,040
1982	67,756	35,484	10,982	24,502	10,368	10,514	11,390
1983	76,239	40,449	11,795	28,654	9,789	13,295	12,706
1984	76,733	38,516	9,825	28,691	10,418	15,011	12,788
1985	87,872	45,934	12,493	33,441	10,408	16,885	14,645

Source: Aerospace Industries Association.
NOTE: See Glossary for explanation of "Aerospace Industry," "Aerospace Sales," and "Related Products & Services." A comprehensive revision of the AIA aerospace industry sales series for 1967-1984 was completed in 1985 in order to incorporate different data sources and estimating procedures selected to better reflect the evolving composition of the aerospace industry.

SALES OF MAJOR AEROSPACE COMPANIES AS REPORTED BY THE BUREAU OF THE CENSUS

Calendar Years 1971-1985
(Millions of Dollars)

Year	GRAND TOTAL	TOTAL		Aircraft, Engines, & Parts		Missiles & Space Incl. Propulsion	Other Aerospace		Non-Aerospace
		U.S. Gov't.	Other	U.S. Gov't.	Other		U.S. Gov't.	Other	
CURRENT DOLLARS									
1971	$21,679	$14,114	$ 7,565	$ 6,313	$ 5,079	$ 4,971	$ 1,909	$ 884	$ 2,523
1972	21,499	13,492	8,007	4,954	5,199	5,598	2,067	1,035	2,646
1973	24,305	14,431	9,874	5,539	6,739	5,580	2,103	1,001	3,343
1974	26,849	15,196	11,653	5,982	7,560	5,854	2,101	1,285	4,067
1975	29,473	17,314	12,159	6,859	7,797	6,310	2,070	1,645	4,792
1976	31,328	19,083	12,245	8,314	7,622	5,880	2,368	1,833	5,311
1977	33,315	20,704	12,611	8,848	7,530	5,775	2,839	2,219	6,104
1978	37,968	21,888	16,080	8,724	10,581	6,380[a]	3,363	2,107[a]	6,813
1979	46,173	23,229	22,944	8,649	16,023	7,197	3,930	2,659	7,715
1980	58,440	26,674	31,766	9,427	20,097	8,393	6,869	2,609	11,045
1981	69,944	33,039	36,905	12,047	21,527	9,722	8,155	3,384	15,109
1982	75,487	42,239	33,248	15,120	16,766	11,980	9,909	4,953	16,759
1983	83,453	49,056	34,397	17,074	18,805	12,745	12,685	2,804	19,340
1984[r]	88,941	55,777	33,164	20,216	17,069	13,624	12,734	2,768	22,530
1985	100,144	63,515	36,629	21,899	22,041	16,712	14,829	2,938	21,726
CONSTANT DOLLARS (1982 = 100)[b]									
1971	$57,050	$37,142	$19,908	$16,613	$13,366	$13,082	$ 5,024	$2,326	$ 6,639
1972	55,987	35,135	20,852	12,901	13,539	14,578	5,383	2,695	6,891
1973	56,655	33,639	23,016	12,911	15,709	13,007	4,902	2,333	7,793
1974	56,883	32,195	24,689	12,674	16,017	12,403	4,451	2,722	8,617
1975	55,609	32,668	22,942	12,942	14,711	11,906	3,906	3,104	9,042
1976	54,014	32,902	21,112	14,334	13,141	10,138	4,083	3,160	9,157
1977	53,647	33,340	20,308	14,248	12,126	9,300	4,572	3,573	9,829
1978	58,055	33,468	24,587	13,339	16,179	9,755	5,142	3,222	10,417
1979	63,863	32,129	31,734	11,963	22,162	9,954	5,436	3,678	10,671
1980	72,777	33,218	39,559	11,740	25,027	10,452	8,554	3,249	13,755
1981	77,372	36,548	40,824	13,326	23,813	10,754	9,021	3,743	16,713
1982	75,487	42,239	33,248	15,120	16,766	11,980	9,909	4,953	16,759
1983	79,555	46,765	32,790	16,276	17,927	12,150	12,092	2,673	18,437
1984	81,747	51,266	30,482	18,581	15,688	12,522	11,704	2,544	20,708
1985	91,123	57,793	33,329	19,926	20,056	15,207	13,493	2,673	19,769

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)," Series MA37D (Annually).

a AIA estimate based on M37D data.

b Based on revised aerospace composite price deflator; detail may not add to totals because of rounding.

r Revised.

ORDERS AND BACKLOG OF MAJOR AEROSPACE COMPANIES AS REPORTED BY THE BUREAU OF THE CENSUS

Calendar Years 1971-1985
(Millions of Current Dollars)

Year	GRAND TOTAL	TOTAL		Aircraft, Engines, & Parts		Missiles & Space Incl. Propulsion	Other Aerospace		Non-Aerospace
		U.S. Gov't.	Other	U.S. Gov't.	Other		U.S. Gov't.	Other	
NET NEW ORDERS									
1971	$21,553	$15,229	$ 6,324	$ 6,621	$ 3,338	$ 5,229	$ 2,155	$1,121	$ 3,089
1972	23,842	14,817	9,025	5,760	5,745	6,090	1,853	965	3,429
1973	27,044	15,804	11,240	6,327	6,684	5,978	1,904	1,107	5,044
1974	32,704	19,390	13,314	7,956	8,612	6,827	2,208	1,872	5,229
1975	28,995	18,593	10,402	7,821	6,336	6,082	2,127	2,068	4,561
1976	35,992	21,056	14,936	9,513	8,410	5,751	2,431	3,241	6,646
1977	38,922	22,682	16,240	9,369	11,193	6,232	3,554	2,170	6,404
1978	49,819	25,992	23,827	11,150	16,961	7,072[b]	4,631	2,450[b]	7,555
1979[a]	67,561[a]	28,107	37,101	8,762	30,695	7,609	5,184	4,487	8,471
1980	69,624	33,496	36,128	16,555	18,123	9,818	8,528	4,081	12,519
1981	74,922	42,431	32,491	16,946	17,911	12,376	9,350	3,250	15,089
1982[a]	89,168[a]	58,849[a]	30,319[a]	20,547	13,591	13,988	13,643	4,762	20,369
1983[a]	91,647	60,290	31,357	22,171	16,428	14,248	15,209	2,641	20,950
1984[r]	104,863	66,968	37,895	25,829	21,273	16,485	14,050	3,461	23,765
1985	110,450	69,722	40,728	23,751	26,191	17,081	15,881	4,378	23,168
BACKLOG AS OF DECEMBER 31									
1971	$24,579	$13,997	$10,582	$ 6,221	$ 8,059	$ 4,780	$ 2,232	$1,042	$ 2,245
1972	26,922	15,322	11,600	7,027	8,605	5,272	2,018	972	3,026
1973	29,661	16,695	12,966	7,815	8,550	5,670	1,819	1,078	4,729
1974	35,516	20,889	14,627	9,789	9,602	6,643	1,926	1,665	5,891
1975	35,038	22,168	12,870	10,751	8,141	6,415	1,983	2,088	5,660
1976	39,702	24,141	15,561	11,950	8,929	6,286	2,046	3,496	6,995
1977	45,309	26,119	19,190	12,471	12,592	6,743	2,761	3,447	7,295
1978	57,160	30,223	26,937	14,897	18,972	7,557	4,029	3,668	8,037
1979[a]	78,548[a]	36,136	42,123	17,316	33,168	7,388	5,613	5,112	9,662
1980	89,732	37,199	52,533	17,435	39,800	8,941	8,421	5,127	10,008
1981	94,710	46,591	48,119	21,292	35,022	11,255	9,052	4,940	13,149
1982[a]	108,391[a]	63,201[a]	45,190[a]	26,644	31,920	13,262	13,268	4,269	16,760
1983	116,585	74,435	42,150	30,688	29,684	14,962	18,489	3,684	19,078
1984[r]	132,507	85,626	46,881	36,312	33,877	17,823	19,684	4,498	20,313
1985	142,813	91,833	50,980	38,150	38,041	18,192	20,092	6,583	21,755

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)," Series MA37D (Annually).

[a] 1979 and 1982 Orders and Backlog Totals are final revisions for which product group detail is not available.

[b] AIA estimate based on M37D data.

[r] Revised.

AEROSPACE SALES AND THE NATIONAL ECONOMY

Calendar Years 1971-1985
(Billions of Dollars)

Year	Gross National Product[c]	Industry Sales			Aerospace Sales As Percent of		
		Manufacturing[r]	Durable Goods	Aerospace	GNP[r]	Manufacturing	Durable Goods
CURRENT DOLLARS							
1971	$1,102.7	$ 670.9	$ 359.5	$22.8	2.1%	3.4%	6.3%
1972	1,212.8	756.3	408.3	23.6	1.9	3.1	5.8
1973	1,359.3	875.2	476.2	25.8	1.9	2.9	5.4
1974	1,472.8	1,017.5	530.8	27.5	1.9	2.7	5.2
1975	1,598.4	1,039.1	523.9	29.7	1.9	2.9	5.7
1976	1,782.8	1,185.6	608.4	29.8	1.7	2.5	4.9
1977	1,990.5	1,358.4	711.2	32.2	1.6	2.4	4.5
1978	2,249.7	1,522.9	814.2	37.7	1.7	2.5	4.6
1979	2,508.2	1,727.2	912.7	45.4	1.8	2.6	5.0
1980	2,732.0	1,852.7	930.6	54.7	2.0	3.0	5.9
1981	3,052.6	2,017.5	1,006.5	64.0	2.1	3.2	6.4
1982	3,166.0	1,910.3	922.3	67.8	2.1	3.5	7.4
1983	3,401.6	2,045.3	1,019.4	80.0	2.4	3.9	7.8
1984	3,774.7	2,274.9	1,182.0	83.5	2.2	3.7	7.1
1985	3,988.5	2,341.2	1,243.8	96.6	2.4	4.1	7.8

CONSTANT DOLLARS (1982 = 100)[a]					Real Annual Growth[b]			
					GNP	Mfg.	Durs.	Aero.
1971	$2,483.6	$1,511.0	$ 809.7	$59.9	2.7%	0.1%	0.4%	(11.9)%
1972	2,608.2	1,626.5	878.1	61.5	5.0	7.6	8.4	2.7
1973	2,746.1	1,768.1	962.0	60.2	5.3	8.7	9.6	(2.1)
1974	2,727.4	1,884.3	983.0	58.2	(0.7)	6.6	2.2	(3.3)
1975	2,695.4	1,752.3	883.5	56.0	(1.2)	(7.0)	(10.1)	(3.8)
1976	2,825.4	1,878.9	964.2	51.4	4.8	7.2	9.1	(8.2)
1977	2,957.7	2,018.4	1,056.8	51.9	4.7	7.4	9.6	1.0
1978	3,115.9	2,109.3	1,127.7	57.6	5.3	4.5	6.7	11.0
1979	3,191.1	2,197.5	1,161.2	62.8	2.4	4.2	3.0	9.0
1980	3,187.9	2,161.8	1,085.9	68.1	(0.1)	(1.6)	(6.5)	8.4
1981	3,247.4	2,146.3	1,070.7	70.8	1.9	(0.7)	(1.4)	4.0
1982	3,166.0	1,910.3	922.3	67.8	(2.5)	(11.0)	(13.9)	(4.2)
1983	3,277.1	1,970.4	982.1	76.2	3.5	3.1	6.5	12.4
1984	3,491.9	2,104.4	1,093.4	76.7	6.6	6.8	11.3	0.7
1985	3,570.7	2,096.0	1,113.5	87.9	2.2	(0.4)	1.8	14.6

Source: Gross National Product and GNP Implicit Price Deflator: "Economic Report of the President" (Annually) and "Survey of Current Business" (Monthly). Sales of Manufacturing and Durable Goods Industries: "Survey of Current Business" (Monthly). Aerospace Sales: Aerospace Industries Association.

NOTE: See Glossary for explanation of "Aerospace Sales."

[a] Based on aerospace composite price deflator for aerospace industry sales, and GNP implicit price deflator for other series.

[b] Parentheses indicate negative real annual growth.

[c] Calendar year GNP figures have been changed to reflect revisions to the National Income and Product Accounts (NIPA).

[r] Revised.

GROSS NATIONAL PRODUCT, FEDERAL BUDGET AND DEFENSE BUDGET

Fiscal Years 1951-1987
(Billions of Dollars)

Year	Fiscal Year GNP[c]	Federal Budget Outlays		Defense Outlays as Percent of	
		Net Total[a,r]	Defense[b]	GNP[r]	Federal Budget[r]
1951	$ 314.7	$ 45.5	$ 23.6	7.5%	51.9%
1952	342.7	67.7	46.1	13.5	68.1
1953	365.1	76.1	52.8	14.5	69.4
1954	369.4	70.9	49.3	13.3	69.5
1955	387.6	68.4	42.7	11.0	62.4
1956	418.0	70.6	42.5	10.2	60.2
1957	441.2	76.6	45.4	10.3	59.3
1958	449.8	82.4	46.8	10.4	56.8
1959	479.5	92.1	49.0	10.2	53.2
1960	507.7	92.2	48.1	9.5	52.2
1961	519.0	97.7	49.6	9.6	50.8
1962	556.6	106.8	52.3	9.4	49.0
1963	588.6	111.3	53.4	9.1	48.0
1964	629.4	118.5	54.8	8.7	46.2
1965	673.6	118.2	50.6	7.5	42.8
1966	740.5	134.5	58.1	7.8	43.2
1967	793.5	157.5	71.4	9.0	45.3
1968	852.4	178.1	81.9	9.6	46.0
1969	929.5	183.6	82.5	8.9	44.9
1970	990.5	195.6	81.7	8.2	41.8
1971	1,057.1	210.2	78.9	7.5	37.5
1972	1,151.2	230.7	79.2	6.9	34.3
1973	1,285.5	245.7	76.7	6.0	31.2
1974	1,417.0	269.4	79.3	5.6	29.4
1975	1,523.5	332.3	86.5	5.7	26.0
1976	1,699.6	371.8	89.6	5.3	24.1
1977	1,935.8	409.2	97.2	5.0	23.8
1978	2,173.4	458.7	104.5	4.8	22.8
1979	2,452.2	503.5	116.3	4.7	23.1
1980	2,667.6	590.9	134.0	5.0	22.7
1981	2,986.2	678.2	157.5	5.3	23.2
1982	3,141.5	745.7	185.3	5.9	24.8
1983	3,320.9	808.3	209.9	6.3	26.0
1984	3,695.3	851.8	227.4	6.2	26.7
1985	3,936.8	946.3	252.7	6.4	26.7
1986[E]	4,192.2	979.9	265.8	6.3	27.1
1987[E]	4,538.1	994.0	282.2	6.2	28.4

Source: "The Budget of the United States Government" (Annually) and Office of Management and Budget, "Federal Government Finances, 1985 Budget Data."

[a] "Net Total" is government-wide total less intragovernmental transactions.

[b] "Defense" includes the military budget of DOD and other defense-related activities. Beginning in FY 1985, the Federal Budget reflects establishment of a military retirement trust fund. Defense budget data for prior years adjusted for comparable treatment of military retired pay.

[c] Fiscal year GNP figures have been changed to reflect revisions to the National Income and Product Accounts (NIPA) issued in December 1985.

[E] Estimate.

[r] Revised.

FEDERAL OUTLAYS
DEFENSE, NASA AND AEROSPACE PRODUCTS AND SERVICES

Fiscal Years 1961-1987
(Millions of Dollars)

Year	TOTAL National Defense	TOTAL NASA	Federal Outlays for Aerospace Products & Services			Aerospace as Percent of Total National Defense and NASA[r]
			TOTAL	DOD[a]	NASA	
1961	$ 49,601	$ 744	$ 9,516	$ 8,870	$ 646	18.9%
1962	52,345	1,257	11,244	10,101	1,143	21.0
1963	53,400	2,552	12,453	10,126	2,327	22.3
1964	54,757	4,171	13,363	9,630	3,733	22.7
1965	50,620	5,093	11,858	7,296	4,561	21.3
1966	58,111	5,933	14,064	8,704	5,360	22.0
1967	71,417	5,426	15,478	10,341	5,137	20.1
1968	81,926	4,724	16,279	11,681	4,598	18.8
1969	82,497	4,251	15,871	11,686	4,185	18.3
1970	81,692	3,753	14,559	10,860	3,699	17.0
1971	78,872	3,382	13,109	9,771	3,338	15.9
1972	79,174	3,422	12,308	8,936	3,372	14.9
1973	76,681	3,315	11,359	8,089	3,270	14.2
1974	79,347	3,256	11,168	7,987	3,181	13.5
1975	86,509	3,266	11,554	8,373	3,181	12.9
1976	89,619	3,669	12,364	8,816	3,548	13.3
Tr. Qtr.	22,269	952	2,855	1,959	926	12.3
1977	97,241	3,945	13,229	9,389	3,840	13.1
1978	104,495	3,983	13,926	10,067	3,859	12.8
1979	116,342	4,196	16,686	12,622	4,064	13.8
1980	133,995	4,852	20,270	15,558	4,712	14.6
1981	157,513	5,426	24,280	19,002	5,278	14.9
1982	185,309	6,035	29,501	23,575	5,926	15.4
1983	209,903[r]	6,664	35,364	28,808	6,556	16.3
1984	227,413[r]	7,048	39,662	32,723	6,939	16.9
1985	252,748[r]	7,251	44,416	37,335	7,081	17.1
1986[E]	265,827	7,341	49,410	42,230	7,180	18.1
1987[E]	282,238	7,478	49,481	42,149	7,332	17.1

Source: "The Budget of the United States Government" (Annually).

NOTE: "National Defense" includes the military budget of the Department of Defense and other defense-related activities. "TOTAL NASA" includes all categories of the NASA budget. NASA construction not included in "Aerospace Products and Services." See additional explanation with following table.

[a] Outlays for aircraft and missile procurement. Does not include RDT&E, which DOD has not reported by product group since 1977, and which, for comparability, has been subtracted from data previously reported in this table for earlier years. Also included are revisions to missile procurement data.

[E] Estimate. Latest year reflects Administration's budget proposal.

[r] Revised.

FEDERAL OUTLAYS FOR AEROSPACE PRODUCTS AND SERVICES

Fiscal Years 1961-1987
(Millions of Dollars)

Year	TOTAL	Department of Defense[a]			NASA[b]
		TOTAL	Aircraft	Missiles[c]	
1961	$ 9,516	$ 8,870	$ 5,898	$ 2,972	$ 646
1962	11,244	10,101	6,659	3,442	1,143
1963	12,453	10,126	6,309	3,817	2,327
1964	13,363	9,630	6,053	3,577	3,733
1965	11,858	7,296	5,200	2,096	4,562
1966	14,064	8,704	6,635	2,069	5,360
1967	15,478	10,341	8,411	1,930	5,137
1968	16,279	11,681	9,462	2,219	4,598
1969	15,871	11,686	9,177	2,509	4,185
1970	14,559	10,860	7,948	2,912	3,699
1971	13,109	9,771	6,631	3,140	3,338
1972	12,308	8,936	5,927	3,009	3,372
1973	11,359	8,089	5,066	3,023	3,270
1974	11,168	7,987	5,006	2,981	3,181
1975	11,554	8,373	5,484	2,889	3,181
1976	12,364	8,816	6,520	2,296	3,548
Tr. Qtr.	2,885	1,959	1,557	402	926
1977	13,229	9,389	6,608	2,781	3,840
1978	13,926	10,067	6,971	3,096	3,859
1979	16,686	12,622	8,836	3,786	4,064
1980	20,270	15,558	11,124	4,434	4,712
1981	24,280	19,002	13,193	5,809	5,278
1982	29,501	23,575	16,793	6,782	5,926
1983	35,364	28,808	21,013	7,795	6,556
1984	39,662	32,723	23,196	9,527	6,939
1985	44,416	37,335	26,586	10,749	7,081
1986[E]	49,410	42,230	29,507	12,723	7,180
1987[E]	49,481	42,149	29,503	12,646	7,332

Source: Department of Defense Budget (Annually); NASA Budget (Annually).

[a] Outlays for aircraft and missile procurement. Does not include RDT&E, which DOD has not reported by product group since 1977, and which, for comparability, has been subtracted from data previously reported in this table for earlier years.

[b] Includes Research & Development, and Research & Program Management, and, effective with 1984 data, Space Flight, Control and Data Communications; excludes Construction of Facilities.

[c] 1978 and subsequent years revised by AIA from previously published data to include Navy Weapons Procurement in Missiles Procurement. Beginning 1978, DOD combined Navy Missile Procurement with torpedoes and other related products into Navy Weapons Procurement, of which missiles comprise approximately 80 percent.

[E] Estimate. Latest year reflects Administration's budget proposal.

DEPARTMENT OF DEFENSE
TOTAL MILITARY OUTLAYS BY FUNCTIONAL TITLE[a]

Fiscal Years 1978-1987
(Millions of Dollars)

	1978	1979	1980
TOTAL[d]	$102,348	$113,672	$130,976
Procurement—TOTAL	$19,976	$25,404	$29,021
Aircraft	6,971	8,836	11,124
Missiles[b]	3,096	3,786	4,434
Ships	3,048	4,553	4,222
Weapons[b]	837	1,248	1,249
Ammo	732	958	1,271
Communications & Electronics[c]	1,349	1,618	1,976
Other	3,942	4,405	4,745
Military Personnel—TOTAL	35,553	37,345	40,897
Active Forces	25,116	26,300	28,465
Reserve Forces	1,959	2,107	2,376
Retired Pay	9,171	10,279	11,920
Adjustment: Retirement Trust Fund Accrual[d]	(694)	(1,341)	(1,864)
Research, Development, Test, & Evaluation	10,508	11,152	13,127
Operations & Maintenance	33,578	36,424	44,770
Military Construction	1,932	2,080	2,450
Family Housing	1,405	1,468	1,680
Other	(602)	(201)	(969)

Source: Department of Defense Budget (Annually) and "Status of Funds" (Annual Summaries).
NOTE: Data in parentheses are credit items. Detail may not add to totals because of rounding.

[a] Includes all items in the DOD military budget; excludes the DOD civil budget for the Army Corps of Engineers and other non-defense-related activities.

[b] Beginning in 1978, DOD combined Navy Missiles Procurement with torpedoes and other related products into Navy Weapons Procurement. Missiles comprise approximately 80 percent of the value of this category.

[c] Not available as separate item after 1982; included in Other Procurement.

[d] Beginning in FY1985, the Federal Budget reflects establishment of a military retirement trust fund. Data for previous years have been adjusted on a comparable basis.

[E] Estimate. Latest year reflects Administration's budget proposal.

DEPARTMENT OF DEFENSE
MILITARY OUTLAYS BY FUNCTIONAL TITLE[a] (Continued)

Fiscal Years 1978-1987
(Millions of Dollars)

1981	1982	1983	1984	1985	1986^E	1987^E
$153,838	$180,741	$204,429	$220,838	$245,371	$258,425	$274,265
$ 35,191	$ 43,271	$53,624	$61,879	$70,381	$75,702	$76,708
13,193	16,793	21,013	23,196	26,586	29,507	29,503
5,809	6,782	7,795	9,527	10,749	12,723	12,646
5,218	6,739	7,504	8,487	9,145	9,147	9,425
1,848	2,144	3,420	3,691	3,801	3,768	3,736
1,368	1,647	1,966	1,826	2,080	2,242	2,012
2,399	2,733	11,926	15,152	18,020	18,315	19,386
5,355	6,433					
47,941	55,170	60,886	64,158	67,842	71,437	73,610
33,378	38,522	41,015	42,732	60,344	63,072	64,400
3,031	3,818	4,508	4,923	7,498	8,365	9,210
13,729	14,938	15,945	16,503	(*d*)	(*d*)	(*d*)
(2,197)	(2,109)	(583)	(2)	—	—	—
15,278	17,729	20,554	23,117	27,103	28,702	31,618
51,864	59,674	64,915	67,369	72,348	74,137	80,872
2,458	2,922	3,524	3,706	4,260	4,545	4,592
1,721	1,993	2,126	2,413	2,642	2,446	2,491
(614)	(18)	(1,199)	(1,803)	794	1,455	4,374

FEDERAL PRICE DEFLATORS FOR GNP, DEFENSE, PPI and CPI

1961-1987

Year	GNP		Federal Gov't Defense Purchases		PPI Capital Equip. (CY 1982 = 100)	CPI (Urban) All Items (CY 1982 = 100)
	FY GNP (FY 1982 = 100)	CY GNP (CY 1982 = 100)	Durables (FY 1982 = 100)	Goods & Services (CY 1982 = 100)		
1961	31.44	31.2	32.96	NA	32.8	31.0
1962	32.00	31.9	33.54		33.0	31.3
1963	32.58	32.4	34.65		33.1	31.7
1964	33.05	32.9	34.67		33.4	32.1
1965	33.76	33.8	35.24		33.8	32.7
1966	34.74	35.0	36.12		34.6	33.6
1967	35.93	35.9	37.67		35.8	34.6
1968	37.19	37.7	39.07		37.0	36.0
1969	39.20	39.8	40.50		38.3	38.0
1970	41.48	42.0	42.26		40.1	40.2
1971	43.66	44.4	44.54		41.7	42.0
1972	46.06	46.5	46.58	41.8	42.8	43.3
1973	48.35	49.5	48.71	45.3	44.2	46.0
1974	52.16	54.0	51.32	50.6	50.5	51.1
1975	57.52	59.3	56.34	55.6	58.2	55.8
1976	62.08	63.1	59.80	59.3	62.1	59.0
1977	67.03	67.3	63.89	63.4	66.1	62.8
1978	71.72	72.2	67.66	67.8	71.3	67.6
1979	77.90	78.6	73.86	74.2	77.5	75.2
1980	84.74	85.7	82.02	83.4	85.8	85.4
1981	93.22	94.0	91.36	92.9	94.6	94.2
1982	100.00	100.0	100.00	100.0	100.0	100.0
1983	104.25	103.8	104.58	104.0	102.8	103.2
1984	108.38	108.1	107.49	107.6	105.2	107.6
1985^{p}	112.25	111.7	109.58	111.0	107.6	111.4
1986^{E}	115.97	115.7	112.62	NA	NA	NA
1987^{E}	120.71	120.5	116.74	NA	NA	NA

Source: GNP and Defense Purchases from U.S. Department of Commerce, Bureau of Economic Analysis; PPI-Capital Equipment Deflator and CPI Deflator from U.S. Department of Labor, Bureau of Labor Statistics, 1967 = 100, converted to 1982 base year by AIA. Estimates from Economic Assumptions of the Budget of the United States Government (latest year).

r Revised.
p Preliminary.
E Estimate.
NA Not Available.
Key: CY = Calendar Year.
FY = Fiscal Year.
GNP = Gross National Product.
PPI = Producer Price Index for Capital Equipment.
CPI = Consumer Price Index (for all items), for All Urban Consumers for 1978 and subsequent years, and for All Urban Wage Earners for prior years.

FEDERAL PRICE DEFLATORS FOR AEROSPACE INDUSTRY

Calendar Years 1963-1987

Year	Aerospace Deflators (CY 1982 = 100)[a]						
	Composite	**SIC 3721**	**SIC 3724**	**SIC 3728**	**SIC 3761**	**SIC 3764**	**SIC 3769**
1963	29.6	31.2	26.6	31.1	29.7	26.2	27.3
1964	29.8	30.7	27.5	31.3	30.1	27.2	27.4
1965	30.3	31.4	27.8	31.9	30.5	27.4	28.3
1966	31.2	35.7	28.5	32.8	31.9	28.1	29.2
1967	32.3	33.1	29.3	33.6	33.4	29.0	30.1
1968	33.3	34.2	29.9	34.5	34.6	29.5	31.0
1969	34.6	35.6	31.3	35.6	36.1	30.9	32.4
1970	36.6	37.7	32.9	37.4	38.1	32.5	34.2
1971	38.0	39.3	34.2	38.8	39.7	33.7	35.7
1972	38.4	44.5	35.3	43.4	42.5	35.4	38.1
1973	42.9	45.9	36.3	45.2	42.2	36.6	39.5
1974	47.2	49.9	41.0	52.2	44.5	41.7	44.0
1975	53.0	53.8	49.6	61.2	48.4	50.6	52.2
1976	58.0	58.8	53.9	67.0	53.9	55.4	56.7
1977	62.1	62.6	57.6	69.6	59.5	59.9	61.4
1978	65.4	66.1	64.1	65.5	65.0	65.4	66.1
1979	72.3	72.8	71.5	69.9	74.6	72.0	72.7
1980	80.3	81.2	77.8	77.4	84.4	80.8	80.9
1981	90.4	90.0	90.4	88.8	93.2	92.1	89.5
1982	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1983	104.9	105.2	105.0	104.2	105.4	104.4	102.8
1984	108.8	112.8	107.9	106.0	106.8	105.9	103.3
1985[p]	109.9	111.0	109.1	110.7	108.8	105.9	108.4
1986[E]	113.6	114.7	114.5	113.9	111.7	108.7	111.1
1986[E]	117.8	118.9	119.0	118.4	115.5	112.4	114.8

Source: U.S. Department of Commerce, Bureau of Economic Analysis and International Trade Administration.

[a] Reported by Dept. of Commerce with 1982 base year; years prior to 1972 converted to 1982 base year for comparability.

[p] Preliminary

[E] Estimate.

Key: SIC = Standard Industrial Classification. SIC 3721 = Aircraft; SIC 3724 = Aircraft Engines and Engine Parts; SIC 3728 = Aircraft Parts; SIC 3761 = Missiles and Space Vehicles; SIC 3764 = Space Populsion; SIC 3769 = Space Equipment not elsewhere classified. Aerospace Composite aggregated by weighting individual SIC categories according to constant dollar value of industry shipments.

In 1985, industry sales of aircraft (including engines and parts) reached an all-time high in both current and constant dollar terms. Yet the number of aircraft delivered declined, as it has every year since 1979. The reason is that production emphasis was on higher-value military aircraft and commercial transports, while sales of the lower-value general aviation planes continued to fall.

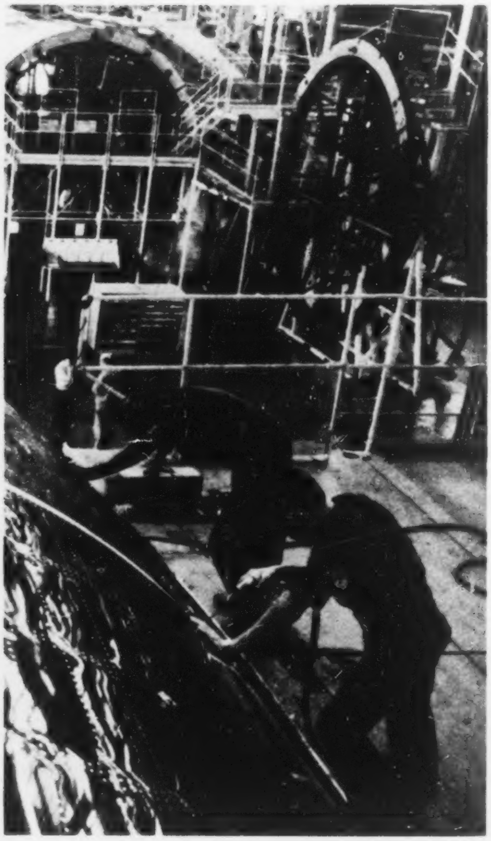
Sales of aircraft, engines and parts amounted to $43.9 billion in 1985, up roughly 17 percent over 1984's $37.3 billion. Numerically, the industry produced 3,613 aircraft of all types, 2,683 of them civil aircraft and 930 military. The comparable figures for 1984 were 3,935 aircraft, 2,999 civil, 936 military.

New orders for aircraft also reached an all-time high at $49.9 billion, which compares with $47.2 billion in the previous year. In 1985, orders from non-government sources ($26.2 billion) outstripped U.S. government orders ($23.8 billion) for the first time since 1981; this was due to a surge of orders for civil transport aircraft, an area of depressed activity in earlier years of the 1980s. The backlog of orders at yearend 1985 was $76.2 billion, up from $70.3 billion at the end of 1984. The composition of the backlog was roughly half government, half non-government orders.

Among other 1985 aircraft production highlights:

- The 2,683 civil aircraft produced during the year represented the lowest number in more than 30 years. Dollar value, however, increased substantially, from $7.7 billion in 1984 to $10.4 billion in 1985.
- The industry delivered 278 commercial transport aircraft, 93 more than in the previous year and the highest number since 1981. Transport dollar value was $8.5 billion, up from $5.7 billion in 1984. At yearend 1985, the industry has orders for 662 transports valued at $19.5 billion; those figures compare with a backlog of 489 aircraft worth $16.6 billion at the end of the previous year. The backlog of orders from foreign customers was 252 transports with a total value of $7.9 billion.
- Production of civil helicopters—376 units—was exactly the same as in the preceding year but dollar value was up substantially, from $330 million in 1984 to $505

Aircraft Production



86 87

million in 1985. However, the latter figure was still well below the $656 million sales volume of the peak year 1980.

- The decline in production of general aviation aircraft, in evidence since 1978, continued in 1985 with shipments of only 2,029 planes, a dip of 409 units below the 1984 level. Dollar value of shipments also declined, to $1.4 billion from $1.7 billion in 1984. The dollar volume in 1985 was less than half that of the peak year 1981 when sales of $2.9 billion were recorded.

- The 930 military aircraft delivered in 1985, six fewer than in 1984, included 654 planes retained for service with U.S. military agencies and 276 aircraft shipped abroad under Foreign Military Sales (FMS) programs or direct commercial contracts with foreign governments. The 654 U.S. aircraft represented a significant increase over 1984's 561. FMS sales increased from 71 units in 1984 to 127 in 1985, but direct export sales were down markedly, from 304 units in 1984 to 149 in 1985.

- A breakdown of the 654 aircraft retained for U.S. military service shows that the Navy took delivery of 292, the Air Force 190 and the Army 172.

- Although the 930 military aircraft produced in 1985 represented the lowest figure in post-World War II history, flyaway costs continued to rise. The USAF's 190 aircraft had a combined flyaway value of $6.0 billion, compared with 197 planes worth $3.5 billion in 1984. Total flyaway cost for the Navy's 292 planes was $5.5 billion; the comparable 1984 figures are 213 aircraft valued at $4.0 billion. Flyaway value of the Army's 169 helicopters and three fixed wing aircraft was $1.0 billion; in 1984 the Army accepted 145 helicopters and six fixed wing planes with a total flyaway cost of $769 million. ☐

SALES OF AIRCRAFT, ENGINES, AND PARTS

Calendar Years 1971-1985
(Millions of Dollars)

Year	GRAND TOTAL	TOTAL		Complete Aircraft & Parts		Aircraft Engines & Parts	
		U.S. Gov't.	Other	U.S. Gov't.	Other	U.S. Gov't.	Other
CURRENT DOLLARS							
1971	$11,392	$ 6,313	$ 5,079	$ 4,953	$ 4,093	$1,360	$ 986
1972	10,153	4,954	5,199	3,666	4,085	1,288	1,114
1973	12,278	5,539	6,739	4,231	5,322	1,308	1,417
1974	13,542	5,982	7,560	4,562	5,846	1,420	1,714
1975	14,656	6,859	7,797	5,269	6,001	1,590	1,796
1976	15,936	8,314	7,622	6,336	5,900	1,978	1,722
1977	16,378	8,848	7,530	6,855	5,670	1,993	1,860
1978	19,305	8,724	10,581	6,853	7,873	1,871	2,708
1979	24,672	8,649	16,023	6,378	12,701	2,271	3,322
1980	29,524	9,427	20,097	6,724	15,901	2,703	4,196
1981	33,574	12,047	21,527	8,197	16,877	3,850	4,650
1982	31,886	15,120	16,766	10,903	12,316	4,217	4,450
1983	35,879	17,074	18,805	12,898	14,419	4,176	4,386
1984	37,285	20,216	17,069	15,136	13,121	5,080	3,948
1985	43,940	21,899	22,041	17,783	16,466	4,116	5,575
CONSTANT DOLLARS (1982 = 100)[a]							
1971	$29,979	$16,613	$13,366	$13,034	$10,771	$3,579	$2,595
1972	26,440	12,901	13,539	9,547	10,638	3,354	$2,901
1973	28,620	12,911	15,709	9,862	12,406	3,049	3,303
1974	28,691	12,674	16,017	9,665	12,386	3,008	3,631
1975	27,653	12,942	14,711	9,942	11,323	3,000	3,389
1976	27,476	14,334	13,141	10,924	10,172	3,410	2,969
1977	26,374	14,248	12,126	11,039	9,130	3,209	2,995
1978	29,518	13,339	16,179	10,479	12,038	2,861	4,141
1979	34,124	11,963	22,162	8,822	17,567	3,141	4,595
1980	36,767	11,740	25,027	8,374	19,802	3,366	5,225
1981	37,139	13,326	23,813	9,067	18,669	4,259	5,144
1982	31,886	15,120	16,766	10,903	12,316	4,217	4,450
1983	34,203	16,276	17,927	12,296	13,745	3,981	4,181
1984	34,269	18,581	15,688	13,912	12,060	4,669	3,629
1985	39,982	19,926	20,056	16,181	14,983	3,745	5,073

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)," Series MA37D (Annually).
[a] Based on revised aerospace composite price deflator; detail may not add to totals because of rounding.
[r] Revised.

ORDERS AND BACKLOG OF AIRCRAFT, ENGINES, AND PARTS

Calendar Years, 1971-1985
(Millions of Current Dollars)

Year	GRAND TOTAL	TOTAL		Complete Aircraft & Parts		Aircraft Engines & Parts	
		U.S. Gov't.	Other	U.S. Gov't.	Other	U.S. Gov't.	Other
NET NEW ORDERS							
1971	$ 9,959	$ 6,621	$ 3,338	$ 5,166	$ 2,615	$1,455	$ 723
1972	11,505	5,760	5,745	4,495	4,317	1,265	1,428
1973	13,011	6,327	6,684	4,838	5,199	1,489	1,485
1974	16,568	7,956	8,612	[illegible]48	6,467[a]	2,008	2,145[a]
1975	14,157	7,821	6,336	6,314	4,758[a]	1,507	1,578[a]
1976	17,923	9,513	8,410	7,498	6,316[a]	2,015	2,094[a]
1977	20,562	9,369	11,193	6,507	8,406	2,862	2,787
1978	28,111	11,150	16,961	9,055	14,229	2,095	2,732
1979	39,457	8,762	30,695	8,762	25,084[a]	2,348	5,611[a]
1980	34,678	16,555	18,123	11,606	14,427	4,949	3,696
1981	34,857	16,946	17,911	11,760	12,621	5,186	5,290
1982	34,138	20,547	13,591	15,978	10,540	4,569	3,051
1983	38,599	22,171	16,428	17,402	11,688	4,769	4,740
1984	47,240	25,829	21,411	19,228	18,286	6,601	3,125
1985	49,942	23,751	26,191	20,062	20,153	3,689	6,038
BACKLOG AS OF DECEMBER 31							
1971	$14,280	$ 6,221	$ 8,059	$ 4,876	$ 7,123	$1,345	$ 936
1972	15,632	7,027	8,605	5,705	7,355	1,322	1,250
1973	16,365	7,815	8,550	6,312	7,232	1,503	1,318
1974	19,391	9,789	9,602	7,698	7,791	2,091	1,811
1975	18,892	10,751	8,141	8,743	6,646	2,008	1,495
1976	20,879	11,950	8,929	9,905	7,416	2,045	1,513
1977	25,063	12,471	12,592	9,557	10,152	2,914	2,440
1978	33,869	14,897	18,972	11,759	16,508	3,138	2,464
1979	50,484	17,316	33,168	13,331	27,955	3,985	5,213
1980	57,235	17,435	39,800	12,702	33,258	4,733	6,542
1981	56,314	21,292	35,022	15,626	27,683	5,666	7,339
1982	58,564	26,644	31,920	20,626	25,980	6,018	5,940
1983	60,372	30,688	29,684	24,091	23,377	6,597	6,307
1984	70,327	36,312	34,015	28,183	28,542	8,129	5,473
1985	76,191	38,150	38,041	30,462	32,091	7,688	5,950

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)," Series MA37D (Annually).

[a] AIA estimate, based on MQ37D data.

U.S. AIRCRAFT PRODUCTION—CIVIL

Calendar Years 1969-1985

Year	TOTAL	Domestic Shipments			Export Shipments		
		Transports[a]	Helicopters	General Aviation	Transports	Helicopters	General Aviation
1969	13,505	332	282	9,996	182	252	2,461
1970	8,076	127	150	5,246	184	332	2,037
1971	8,158	50	171	5,900	173	298	1,566
1972	10,576	79	319	7,702	148	256	2,072
1973	14,709	143	342	10,482	151	428	3,163
1974	15,326	91	433	9,903	241	395	4,263
1975	15,251	127	528	10,804	188	336	3,268
1976	16,429	64	442	12,232	158	315	3,218
1977	17,913	54	527	13,441	101	321	3,469
1978	18,962	130	536	14,346	111	368	3,471
1979	18,460	176	570	13,177	200	459	3,878
1980	13,634	150	841	8,703	237	525	3,178
1981	10,916	132	619	6,840	255	453	2,617
1982	5,085	111	333	3,326	121	254	940
1983	3,356	133	187	2,172	129	216	519
1984	2,999	102	143	2,013	83	233	425
1985	2,683	126	239	1,545	152	137	484

Source: Civil shipments data from company reports to AIA and General Aviation Manufacturers Association. Export data from Dept. of Commerce (Bureau of Census) Report FT410.

[a] Prior to 1976, includes the C-130 military transport.

U.S. AIRCRAFT PRODUCTION—MILITARY

Calendar Years 1969-1985

MILITARY AIRCRAFT

Year	TOTAL	U.S. Military Agencies	Exports		
			Total	FMS[a]	Direct[b]
1969	4,290	3,644	646	NA	NA
1970	3,720	3,085	635	NA	NA
1971	2,914	2,232	682	NA	NA
1972	2,530	1,993	537	124	413
1973	1,821	1,243	578	129	449
1974	1,513	799	714	365	349
1975	1,779	844	935	525	410
1976	1,318	625	693	518	175
1977	1,134	454	680	408	272
1978	996	467	529	256	273
1979	837	531	306	203	103
1980	1,047	625	422	194	228
1981	1,062	703	359	215	144
1982	1,159	690	469	68	401
1983	1,053	766	287	70	217
1984[r]	936	561	375	71	304
1985	930	654	276	127	149

Source: Military acceptances for use of U.S. military agencies and for reimbursable programs reported by USAF, USN and Army. Export data from Dept. of Commerce (Bureau of the Census) Report FT 410.

[a] Also includes acceptances of NATO AWACS aircraft.

[b] Military aircraft exported via commercial contracts, directly from manufacturers to foreign governments.

CIVIL AIRCRAFT SHIPMENTS

Calendar Years 1971-1985

Year	TOTAL	Transport Aircraft[a]	Helicopters	General Aviation
NUMBER OF AIRCRAFT SHIPPED				
1971	8,158	223	469	7,466
1972	10,576	227	575	9,774
1973	14,709	294	770	13,645
1974	15,326	332	828	14,166
1975	15,251	315	864	14,072
1976	16,429	222	757	15,450
1977	17,913	155	848	16,910
1978	18,962	241	904	17,817
1979	18,460	376	1,029	17,055
1980	13,634	387	1,366	11,881
1981	10,916	387	1,072	9,457
1982	5,085	232	587	4,266
1983	3,356	262	403	2,691[b]
1984	2,999	185	376	2,438
1985	2,683	278	376	2,029
VALUE—Millions of Dollars				
1971	$ 2,984	$2,594	$ 69	$ 321
1972	3,308	2,660	90	558
1973	4,665	3,718	121	826
1974	5,091	3,993	189	909
1975	5,086	3,779	274	1,033
1976	4,592	3,078	285	1,229
1977	4,451	2,649	251	1,551
1978	6,458	4,308	328	1,822
1979	10,644	8,030	403	2,211
1980	13,058	9,895	656	2,507
1981	13,223	9,706	597	2,920
1982	8,610	6,246	365	1,999
1983	9,773	8,000	303	1,470[b]
1984	7,717	5,689	330	1,698
1985	10,436	8,500	505	1,431

Source: Transport Aircraft and Helicopters: Aerospace Industries Association, company reports.
General Aviation: General Aviation Manufacturers' Association and Aerospace Industries Association.

[a] U.S.-manufactured fixed-wing aircraft over 33,000 pounds empty weight, including all jet transports plus the four-engine turboprop-powered Lockheed L-100.

[b] Includes 3 off-the-shelf Gulfstream G-III's delivered to the U.S. Air Force for C-20 VIP transports.

CIVIL TRANSPORT AIRCRAFT BACKLOG[a]

As of December 31, 1981-1985

Company and Model	1981	1982	1983	1984	1985
TOTAL AIRCRAFT ON ORDER					
(Domestic and Foreign Orders)	526	455	352	489	662
Value (Millions of Dollars)	$17,198	$16,321	$12,591	$16,588	$19,519
Boeing—TOTAL	447	356	273	345	472
B-727	35	19	8	—	—
B-737	146	93	93	170	304
B-747	37	26	22	38	51
B-757	82	80	58	62	77
B-767	147	138	92	75	40
Lockheed—TOTAL	27	11	1	2	2
L-1011	21	7	1	2	—
L-100	6	4	—	—	2
McDonnell Douglas—TOTAL	52	88	78	142	188
DC-9/MD-80	43	85	78	137	180
DC-10	9	3	—	5	8
TOTAL FOREIGN ORDERS	213	196	139	167	252
Value (Millions of Dollars)	$ 7,702	$ 7,322	$ 5,420	$6,941	$7,929
Boeing—TOTAL	180	142	100	120	158
B-727	10	1	—	—	—
B-737	71	45	29	45	98
B-747	37	26	18	38	38
B-757	22	22	16	7	8
B-767	40	48	37	30	16
Lockheed—TOTAL	17	9	1	2	2
L-1011	11	5	1	2	—
L-100	6	4	—	—	2
McDonnell Douglas—TOTAL	16	45	38	45	90
DC-9/MD-80	8	42	38	45	90
DC-10	8	3	—	—	—

Source: Aerospace Industries Association, company reports.

[a] Unfilled firm orders on the books, excluding options, and new aircraft contracted for lease from manufacturer to customer, for U.S. manufactured transport aircraft over 33,000 lbs. including all jet transports plus the turboprop-powered Lockheed L-100.

SHIPMENTS OF CIVIL TRANSPORT AIRCRAFT[a]

Calendar Years 1981-1985

Company and Model	1981	1982	1983	1984	1985
TOTAL					
Number of Aircraft Shipped	387	232	262	185	278
Value (Millions of Dollars)	$9,706	$6,246	$8,000	$5,689	$8,500
Boeing—TOTAL	255	169	196	138	200
B-707	—	1	—	—	—
B-727	94	26	11	8	—
B-737	108	95	82	67	115
B-747	53	25	23	16	24
B-757	—	2	25	18	36
B-767	—	20	55	29	25
Lockheed—TOTAL	36	17	11	7	7
L-1011	28	14	6	4	2
L-100	8	3	5	3	5
McDonnell Douglas—TOTAL	96	46	55	40	71
DC-9/MD-80	77	41	51	38	71
DC-10	19	5	4	2	—

Source: Aerospace Industries Association, company reports.

[a] U.S.-manufactured fixed-wing aircraft over 33,000 lbs. empty weight; all are jet-powered except the four-engine turboprop-powered Lockheed L-100.

SPECIFICATIONS OF U.S. CIVIL JET TRANSPORT AIRCRAFT[a]

On Order or In Production as of 1985

Number of Engines and Crew, and Model Designation[b]	Initial Service	Standard Mixed Class	Operating Empty Weight (000's lbs)	Maximum Takeoff Gross Weight (000's lbs)	Range (Nautical Miles)[c]	Engines (Manufacturer[d] and Model)
FOUR ENGINES/CREW OF 3						
747-200*	1971	452	379	775-833	5,350	P&W JT9D-7AW
747SP*	1976	331	325	700	6,100	P&W JT9D-7AW
747-300 (EUD)*	1983	496	388	775-785	5,500	P&W JT9D-7AW
747-400	1988	624	386	850	8,000	P&W 4000 or GE CF6-80C2
THREE ENGINES/CREW OF 3						
L-1011-100*	1975	304	246	466	3,460-3,705	RR RB211-22B
L-1011-500*	1979	242	246	496-504	5,040-5,225	RR RB211-524B4
DC-10-10*	1971	250	245	440	3,750	GE CF6-6D
DC-10-15*	1981	278	247	455	3,800-4,000	GE CF6-50C2-F
DC-10-30*	1972	275	271	580	5,470	GE CF6-50C2
DC-10-40*	1972	275	273	580	5,300	P&W JT9D-59A
TWO ENGINES/CREW OF 2						
737-200	1971	110	61	116-119	1,800	P&W JT8D-9A/15/17/17R
737-300	1984	128	72	125-136	2,300	CFMI-CFM56-3
757-200	1982	186	128-130	220-240	2,300-3,800	RR RB211-535C/E4 or P&W 2037
767-200*	1982	216	178-179	282-310	3,650	P&W JT9D-7R4 or GE CF6-80A
767-200ER*	1984	216	189-190	351	5,300	P&W JT9D-7R4 or GE CF6-80A
767-300*	1986	261	189-190	351	3,650	P&W JT9D-7R4 or GE CF6-80A
MD-80:						
MD-81	1980	142	78	140	1,700	P&W JT8D-209
MD-82	1981	142	78	149	2,080	P&W JT8D-217A
MD-83	1985	142	80	160	2,590	P&W JT8D-219

Source: Aerospace Industries Association, based on company reports.

[a] All jet-powered passenger transport aircraft 33,000 pounds or more empty weight.

[b] Manufacturers are The Boeing Company (727, 737, 747, 757, and 767), Lockheed Corporation (L-1011), and McDonnell Douglas Corporation (MD-80 and DC-10).

[c] Full passenger load and baggage.

[d] P&W = Pratt and Whitney Aircraft Company of United Technologies Corporation; GE = General Electric Company; RR = Rolls-Royce Limited; CFMI = General Electric/Snecma.

* Wide-body aircraft.

SPECIFICATIONS OF U.S. CIVIL HELICOPTERS

In Production as of 1985

Company	Commercial Model	Number of Places	Useful load (Lbs.)	Range with Useful Load (N. Miles)	External Cargo Payload (Lbs.)
Bell Helicopter Textron Textron Inc.	206 Series	4-5	1315-1630	240-304	1200-1500
	206L Series	7	1894-1931	297-308	2000
	212	15	5672	226	5000
	214 Series	16	5450-6059	219-400	6000-7000
	222	6-10	2975	379	2500
	412	15	5430	402	5000
Boeing Vertol Company	234 (LR)	47	22,600	654	28,000
	234 (UT)	3	29,400	264	28,000
The Enstrom Helicopter Corp.	F-28 Series	3	700-850	238-272	500-1000
	280 Series	3	700-850	243-272	500-1000
Hiller Helicopters Rogerson Aircraft Corp.	12-E Series	3-4	1264-1341	215	1000
	12-ET Series	3-4	1450	351	1000
	RH-1100	5	1355	396	1500
Hynes Helicopter, Inc.	B-2B	2	670	225	400
	305	5	1200	275	800
McDonnell Douglas Helicopter Co.[b]	300 Series[a]	3	698-1004	191-224	1104
	500 Series	4-7	1320-1660	276-287	1560-2000
Robinson Helicopter Co.	R22	2	544	208	—
Schweizer Aircraft Corp.	300C[a]	3	950	224	1050
Sikorsky Aircraft Div. United Technologies Corp.	S-76 (MARK II)	14	4525	466	4200
	S-70C Commercial Utility	21	11,842	250	8000

Source: Aerospace Industries Association, "Directory of Helicopter Operators in the United States, Canada, Mexico and Puerto Rico, 1982/83" and "AIA Directory of VTOL Aircraft, 1983."

[a] In 1983, Schweizer Aircraft became the licensed manufacturer for the Hughes 300C, redesignated the Schweizer-Hughes 300C, with product support beginning in 1983, and production beginning in 1984.

[b] McDonnell Douglas Corporation acquired Hughes Helicopters in January 1984.

CIVIL HELICOPTER SHIPMENTS[a]

Calendar Years 1981-1985

Company and Model	1981	1982	1983	1984	1985
CIVIL SHIPMENTS	1,072	587	403	376	376
Value (Millions of Dollars)	$ 597	$365	$303	$330	$505
Bell—TOTAL	609	272	159	151	146
206 series	476	193	107	94	87
212	49	32	6	18	8
214 series	12	10	11	13	10
222	21	15	17	26	22
412	51	22	18	—	19
Boeing Vertol—TOTAL	5	1	4	—	4
234	5	1	4	—	4
Enstrom-TOTAL	46	24	9	5	18
F-28 series	29	17	8	2	11
280 series	17	7	1	3	7
Hiller—TOTAL	30	12	7	—	2
12-E series	23	6	6	—	2
12-ET series	6	3	1	—	—
FH/H-1100	1	3	—	—	—
Hughes—TOTAL	184	162	137	92	56
300 series	50	54	67	(b)	(b)
500 series	134	108	70	85	48
530 series		—	—	7	8
Robinson—TOTAL	156	88	64	79	79
R22	156	88	64	79	79
Schweizer—TOTAL	—	—	—	11	24
300C[b]	—	—	—	11	24
Sikorsky (UTC)—TOTAL	42	28	23	38	47
S-76	42	28	23	27	19
S-70A	—	—	—	2	—
S-70B-3	—	—	—	—	2
S-70C-series	—	—	—	9	26

Source: Aerospace Industries Association, company reports.

NOTE: All data exclude production by foreign licensees.

[a] Domestic and export helicopter shipments for non-military use. The data in this table have been revised to separate out direct military exports (involving commercial contracts between U.S. manufacturers and foreign governments) which are now reported elsewhere in this chapter. Models which may be shipped in either a civil or a military configuration appear in both tables.

[b] Beginning with 1984 production, Schweizer Aircraft became the licensed manufacturer for the Hughes 300C, redesignated the Schweizer-Hughes 300C.

DIRECT EXPORT SHIPMENTS OF MILITARY HELICOPTERS[a]

Calendar Years 1981-1985

Model	1981	1982	1983	1984	1985
DIRECT MILITARY EXPORT SHIPMENTS	33	42	54	31	38
Value (Millions of Dollars)	$186	$77	$90	$59	$75
Bell AH-1S	—	—	15	—	10
Boeing Vertol CH-47/414/352	23	8	—	3	3
Hiller 12-E	—	20	—	—	—
Hiller 12-ET	—	—	—	—	—
Hughes 500MD (TOW)/ 500 Scout	2	14	26	24	25
Sikorsky S-76	8	—	13	4	—

Source: Aerospace Industries Association, company reports.

[a] Shipments of helicopters in military configuration exported directly from U.S. manufacturers to foreign governments. Military helicopters exported via Foreign Military Sales (FMS) are reported with Dept. of Defense (DOD) aircraft acceptance data elsewhere in this chapter. Some models reported on this page may be shipped in either military or civil configuration; see Civil Helicopter Shipments table for additional data.

GENERAL AVIATION AIRCRAFT SHIPMENTS

By Selected Manufacturers
Calendar Years 1981-1985

	1981	1982	1983	1984	1985
NUMBER OF AIRCRAFT SHIPPED	9,457	4,266	2,691[b]	2,438	2,029
Agricultural	340	174	1,811	1,621	1,370
Single-Engine, Piston	6,268	2,697			
Multi-Engine, Piston	1,542	678	417	374	193
Turboprop	918	458	321	272	321
Turbojet	389	259	142[b]	171	145
VALUE OF SHIPMENTS[a] (Millions of Dollars)	$2,920	$1,999	$1,470[b]	$1,698	$1,431
Agricultural	$ 24	$ 199	$ 145	$ 149	$ 124
Single-Engine, Piston	315				
Multi-Engine, Piston	389	220	115	135	56
Turboprop	1,017	590	460	443	542
Turbojet	1,175	990	750[b]	971	709
Number of Aircraft By Selected Manufacturer					
Ayres	59	25	9[c]	(c)	(c)
Beech	1,242	526	402	411	288
Cessna	4,680	2,140	1,219	978	881
Fairchild	85	49	39	29	35
Gates Learjet	138	99	45	33	33
Gulfstream	284	96	71[b]	58	55
Lake	52	22	28	26	20
Maule	44	39	36	65	88
Mooney	330	188	154	151	90
Piper	2,495	1,048	661	664	538
Rockwell International	40	—	—	—	—
Schweizer Aircraft	8	34	27	23	(d)

Source: General Aviation Manufacturers' Association and Aerospace Industries Association.

[a] Manufacturers' net billing price.

[b] Includes 3 off-the-shelf Gulfstream G-3's delivered to the U.S. Air Force for C-20 VIP transports.

[c] Data not reported after August 1983.

[d] Data not reported after 1984.

MILITARY AIRCRAFT ACCEPTED BY U.S. MILITARY AGENCIES

Number and Flyaway Value
Calendar Years 1971-1985

Year	TOTAL	Bomber/ Patrol/ Command/ Control	Fighter/ Attack	Trans- port/ Tanker	Trainer	Heli- copter	Other
NUMBER							
1971	2,232	48	386	42	135	1,587	34
1972	2,117	13	563	29	148	1,312	52
1973	1,372	30	422	22	90	808	—
1974	1,110	50	478	27	49	506	—
1975	1,369	62	624	34	40	601	8
1976	1,143	55	646	67	11	348	16
1977	862	44	488	25	12	273	20
1978	723	30	478	28	—	166	21
1979	734	17	529	16	—	158	14
1980	819	16	551	15	18	189	30
1981	918	19	649	17	60	158	15
1982	758	26	478	14	60	172	8
1983	836	34	421	22	120	233	6
1984[r]	632	34	298	18	30	240	12
1985	781	35	411	25	—	307	3
FLYAWAY VALUE—Millions of Dollars							
1971	$2,996	$397	$1,322	$688	$112	$ 469	$ 8
1972	3,247	129	2,068	536	100	396	18
1973	2,571	325	1,490	348	140	268	—
1974	2,224	584	1,222	101	111	206	—
1975	3,172	599	2,054	128	27	359	5
1976	4,729	547	3,421	340	27	384	10
1977	4,364	499	3,190	331	14	316	14
1978	4,664	689	3,496	237	—	225	17
1979	5,470	442	4,660	136	—	219	13
1980	6,514	475	5,282	178	32	516	31
1981	8,446	526	6,518	509	32	825	19
1982	8,605	886	6,383	410	42	872	12
1983	9,640	1,259	6,708	575	79	1,009	10
1984[r]	9,308	1,270	5,774	627	18	1,597	22
1985	14,207	3,387	8,235	838	—	1,741	6

Source: Departments of the Army, Navy, and Air Force.

NOTE: Data represent new U.S.-manufactured aircraft, excluding gliders and targets. Values include spares, spare parts, and support equipment that are procured with the aircraft. Effective 1972, includes aircraft accepted for shipment to foreign governments for military assistance programs and foreign military sales. 1972-1975, flyaway value does not include the value of planes produced for the security assistance programs and accepted by the USAF.

[r] Revised.

MILITARY AIRCRAFT ACCEPTANCES BY UNITED STATES AIR FORCE[a]

Calendar Years 1984 and 1985
(Millions of Dollars)

Type and Model	Number		Flyaway Cost[b]		Weapon System Cost[c]	
	1984	1985	1984	1985	1984	1985
AIR FORCE—TOTAL	197[r]	190	$3,492[r]	$6,037	$4,285[r]	$7,144
Fighter/Attack—TOTAL	169	158	2,614	2,730	3,296	3,293
A-10A	4	—	42	—	46	—
F-15	42	34	1,064	963	1,385	1,255
F-16	123	124	1,508	1,767	1,865	2,038
Bombers—TOTAL	—	4	—	2,349	—	2,840
B-1B	—	4	—	2,349	—	2,840
Transports/Tankers—TOTAL	20[r]	23	568[r]	804	601[r]	849
C-130H	6[r]	12	98[r]	170	103[r]	179
KC-10A	8	11	458	634	486	670
C-12D	6	—	12	—	12	—
Command/Control—TOTAL	8[r]	5	310[r]	154	338[r]	162
E-3A	2	—	141	—	216	—
TR-1A	6[r]	5	169[r]	154	172[r]	162

Source: Department of the Air Force.

NOTE: Costs shown are approximate. Calendar year acceptances may derive from procurement quantities funded in more than one fiscal year.

[a] Air Force acceptances for own use; exclude FMS/MAP shipments.

[b] Flyaway Cost includes airframe, engines, electronics, communications, armament, other installed equipment and non-recurring costs associated with the manufacture of the aircraft.

[c] Weapon System Cost includes flyaway costs, peculiar ground equipment, training equipment and technical data.

[d] Excludes 3 C-20's (off-the-shelf Gulfstream G-3's) delivered to the Air Force (for VIP transport) and included in civil general aviation shipments.

[r] Revised

MILITARY AIRCRAFT ACCEPTANCES BY UNITED STATES ARMY[a]

Calendar Years 1984 and 1985
(Millions of Dollars)

Type and Model	Number		Flyaway Cost[b]		Weapon System Cost[c]	
	1984	1985	1984	1985	1984	1985
ARMY—TOTAL	151	172	$769[r]	$1,022	NA	NA
Helicopters—TOTAL	145	169	759[r]	1,016	NA	NA
AH-1S	6	6	24	24	27	27
AH-64	16	51	142	454	NA	NA
UH-60A	123	112	593[r]	538	629[r]	568
Fixed-Wing—TOTAL	6	3	10	6	10	6
C-12	6	3	10	6	10	6

Source: Department of the Army.

[a] Army acceptances for own use; exclude FMS/MAP shipments.

[b] Flyaway cost includes airframes, engines, electronics, communications, armament and other installed equipment.

[c] Weapon System Cost includes flyaway items, initial spares, ground equipment, training equipment and other support items.

[r] Revised.

NA Not available.

MILITARY AIRCRAFT ACCEPTANCES BY UNITED STATES NAVY[a]

Calendar Years 1984 and 1985
(Millions of Dollars)

Type and Model	Number		Flyaway Cost[b]		Weapon System Cost[c]	
	1984[r]	1985	1984[r]	1985	1984[r]	1985
NAVY—TOTAL	213	292	$3,973	$5,530	NA	$7,903
Patrol—TOTAL	13	21	$ 399	$ 597	$ 593	$ 986
P-3C	7	7	208	220	298	380
E-2C	6	6	191	201	295	320
C-2	—	8	—	176	—	286
Fighter/Attack—TOTAL	93	171	2,710	4,289	3,652	5,800
F-14A	26	21	816	684	1,028	857
F/A-18	38	112	934	2,639	1,445	3,461
AV-8B	12	24	569	613	620	913
A-6E	11	8	205	164	269	247
EA-6B	6	6	186	189	290	322
Helicopters—TOTAL	73	98	775	610	1,277	1,083
CH-53E	18	10	255	154	356	208
TH-57	21	47	13	31	31	69
SH-60B[d]	22	24	410	302	770	664
SH-2F[d]	12	17	97	123	120	142
Support—TOTAL	34	2	89	34	—	34
T-34	30	—	18	—	26	—
EC-130	2	—	29	—	NA	—
KC-130T	2	2	42	34	42	34

Source: Department of the Navy.

[a] Navy acceptances for own use; excludes FMS shipments.

[b] Flyaway Cost includes airframe, engines, electronics, communications, armament, other installed equipment, non-recurring costs and ancillary equipment.

[c] Weapon System Cost (Investment Cost) includes flyaway items, initial spares, ground equipment, training equipment and other support items.

[d] Aircraft acceptances in CY83 and CY84 were for first production lot of 18 aircraft plus first 6 of second production lot; cost figures therefore are not representative of full-rate production costs.

[r] Revised.

NA Not available.

MILITARY AIRCRAFT ACCEPTANCES FOR REIMBURSABLE PROGRAMS[a]

Calendar Years 1984 and 1985
(Millions of Dollars)

Accepting Agency, Type and Model	Number of Aircraft Accepted		Flyaway Cost[b]	
	1984[r]	1985	1984[r]	1985
TOTAL ACCEPTANCES FOR REIMBURSABLE PROGRAMS	71	127	$1,074	$1,618
AIR FORCE—TOTAL	41	85	$ 821	$1,434
Fighter/Attack—TOTAL	36	82	450	1,216
F-5E	10	14	115	134
F-5F	6	4	56	42
F-15	—	9	—	250
F-16 A/B	20	55	279	790
Command/Control—TOTAL	5	3	371	218
E-3A (NATO AWACS)	5	3	371	218
NAVY—TOTAL	8	2	$ 190	$ 69
Patrol—TOTAL	8	2	190	69
P-3C	4	—	60	—
E-2C	4	2	130	69
ARMY—TOTAL	22	40	$ 63	$ 115
Helicopters—TOTAL	22	40	63	115
UH-1H	12	15	20	25
AH-1S	10	21	43	87
500 ME	—	4	—	3

Source: Departments of the Air Force, Navy, and Army.

[a] Foreign Military Sales and NATO AWACS Program.

[b] Flyaway cost includes airframes, engines, electronics, communications, armament, other installed equipment and nonrecurring costs associated with the manufacture of the aircraft.

[r] Revised.

MILITARY AIRCRAFT PROGRAM PROCUREMENT[a]

Fiscal Years 1985, 1986 and 1987
(Millions of Dollars)

Agency, Type and Model	1985		1986[E]		1987[E]	
	No.	Cost	No.	Cost	No.	Cost
AIR FORCE						
AC-130	—	$ —	1	$ 33.4	—	$ 18.2
B-1B	34	7,480.7	48	5,094.9	—	—
C-5B Galaxy	8	1,772.8	16	2,158.6	21	1,953.8
C-12D	6	21.9	6	18.0	—	—
C-17	—	—	—	—	—	217.3
C-20A (C-SAM)	3	57.6	8	164.1	—	—
C-130H Hercules[f]	16	273.7	16	300.0	—	—
CRAF Mods	4	128.9	5	158.8	—	—
Flight Inspection Aircraft	1	23.0	—	—	—	—
F-15 C/D/E Eagle	42	2,045.5	48	1,962.3	48	2,027.3
F-16 Falcon	150	2,804.2	180	3,219.0	216	3,842.6
KC-10A ATCA Extender	8	601.5	12	486.7	8	104.4
KC-135 Re-engining/Modern	43	674.2	43	678.5	50	865.8
LANTIRN (Night Precision Attack)	—	90.0	—	423.9	—	784.6
MC-130H Combat Talon[f]	2	107.1	2	133.7	5	251.5
PLSS (Precision Location Strike System)	—	94.3	—	56.4	—	82.4
Range Control Aircraft	2	34.7	—	—	—	—
T-46A Trainer	10	126.5	—	—	—	—
TR-1/U-2[b]	4	255.4	6	329.3	3	100.4
VC-X (Air Force One Replacement)	—	—	2	280.0	—	74.4
Civil Air Patrol (CAP) Aircraft	38	1.9	—	—	38	1.6
ARMY						
AH-64 Attack Helicopter	138	$1,412.8	144	$1,270.3	144	$1,342.0
C-12	12	24.0	6	12.0	—	—
CH-47 Modernization	48	442.4	48	362.3	48	276.6
EH-60A Quick Fix	18	139.9	18	146.4	18	171.2
OH-58D AHIP Modification	—	234.9	—	237.5	—	246.7
RC-12D Guard Rail	9	100.2	—	13.7	—	5.1
UH-60A Black Hawk[d]	88	477.1	82	455.7	78	355.0
NAVY						
A-6E/F Intruder	6	$ 310.4	11	$ 301.1	11	$ 390.1
AH-1T Sea Cobra	22	211.6	22	205.3	—	37.2
AV-8B Harrier	32	695.5	46	919.0	42	761.9
C-2 Greyhound	8	191.6	8	173.7	9	103.4
C-9B Skytrain II	3	41.3	—	—	—	—
C-20	—	—	2	38.4	—	—
CH/MH-53E Super Stallion	10	254.5	14	283.2	14	236.6
E-2C Hawkeye	6	334.1	6	359.7	6	335.3

(Continued on next page)

MILITARY AIRCRAFT PROGRAM PROCUREMENT[a] (Continued)

Agency, Type and Model	1985		1986[E]		1987[E]	
	No.	Cost	No.	Cost	No.	Cost
NAVY (Continued)						
E-6A	—	—	2	366.2	3	329.4
EA-6B Prowler	6	389.7	12	455.6	12	450.2
F-14 A/D Tomcat	24	977.0	18	784.7	15	695.9
F-16N Adversary Aircraft	10	122.3	12	125.8	—	—
F/A-18 Hornet	84	2,417.1	84	2,436.0	120	3,406.7
KC-130T Hercules	2	53.4	—	—	—	—
P-3C Orion	9	415.8	9	418.5	9	414.2
SH-2F Seasprite (LAMPS MK-I)	6	55.2	6	64.0	6	52.8
SH-60B Seahawk LAMPS	24	421.4	18	293.0	17	234.9
SH-60F CV ASW	—	—	—	30.0	7	179.4
T-34C Mentor	—	—	19	23.7	—	—
T-45 Training System	—	—	—	—	—	56.4
Tanker Conversions	—	—	(c)	105.6	—	—
TH-57 Sea Ranger	36	23.2	—	—	—	—
UC-12B/CX	12	28.9	12	25.6	—	—
VH-60[d]	—	26.9	9	127.9	—	24.7

Source: "Program Acquisition Costs by Weapon System," Department of Defense Budget, (Annually).
NOTE See Research and Development Chapter for aircraft program RDT&E authorization data.
[a] Total Obligational Authority for procurement, including initial spares.
[b] Includes ground stations.
[c] Quantity to be determined.
[d] Army, Navy and Air Force funding.
[E] Estimate. Latest year reflects Administration's budget proposal.
[f] Navy and Air Force funding.

ACTIVE U.S. MILITARY AIRCRAFT IN CONTINENTAL U.S. [a]

Fiscal Years 1976-1987

Fiscal Year	Total	Fixed Wing Aircraft				Helicopter
		Total	Jet	Turboprop	Piston	
1976	19,775	12,126	9,255	1,511	1,360	7,649
1977	18,670	11,625	9,168	1,382	1,075	7,045
1978	18,931	11,748	8,898	1,794	1,056	7,183
1979	18,526	11,365	8,656	1,859	850	7,161
1980	18,969	11,362	8,794	1,869	699	7,607
1981	19,363	11,645	9,111	1,943	591	7,718
1982	21,728	12,063	9,647	1,900	516	9,665
1983	18,652	11,603	9,495	1,745	363	7,049
1984	18,833	11,661	9,551	1,777	333	7,172
1985[p]	19,121	11,868	9,654	1,821	393	7,253
1986[E]	19,255	11,935	9,698	1,855	382	7,320
1987[E]	19,532	12,057	9,786	1,915	356	7,475

Source: Department of Defense, Office of the Secretary of Defense, reported in "FAA Aviation Forecasts" (Annually).
[a] Includes Army, Air Force, Navy, and Marine regular service aircraft, as well as Reserve and National Guard aircraft.
[p] Preliminary.
[E] Estimate.

DEPARTMENT OF DEFENSE OUTLAYS FOR AIRCRAFT PROCUREMENT

By Agency
Fiscal Years 1961-1987
(Millions of Dollars)

Year	TOTAL AIRCRAFT PROCUREMENT	Air Force	Navy	Army
1961	$ 5,898	$ 3,926	$1,832	$ 140
1962	6,659	4,387	2,102	170
1963	6,309	3,747	2,328	234
1964	6,053	3,894	1,859	300
1965	5,200	3,115	1,739	346
1966	6,635	4,074	2,021	540
1967	8,411	4,842	2,607	962
1968	9,462	5,079	3,244	1,139
1969	9,177	5,230	2,821	1,126
1970	7,948	4,623	2,488	837
1971	6,631	3,960	2,125	546
1972	5,927	3,191	2,347	389
1973	5,066	2,396	2,557	113
1974	5,006	2,078	2,806	122
1975	5,484	2,211	3,137	136
1976	6,520	3,323	3,061	136
Tr. Qtr.	1,557	859	672	26
1977	6,608	3,586	2,721	301
1978	6,971	3,989	2,602	380
1979	8,836	5,138	3,140	558
1980	11,124	6,647	3,689	787[r]
1981	13,193	7,941	4,397	855
1982	16,793	9,624	5,872	1,297
1983	21,013	11,799	7,490	1,724
1984	23,196	12,992	8,040	2,165
1985	26,587	15,619	8,263	2,705
1986[E]	29,508	17,140	9,416	2,952
1987[E]	29,504	17,296	9,298	2,910

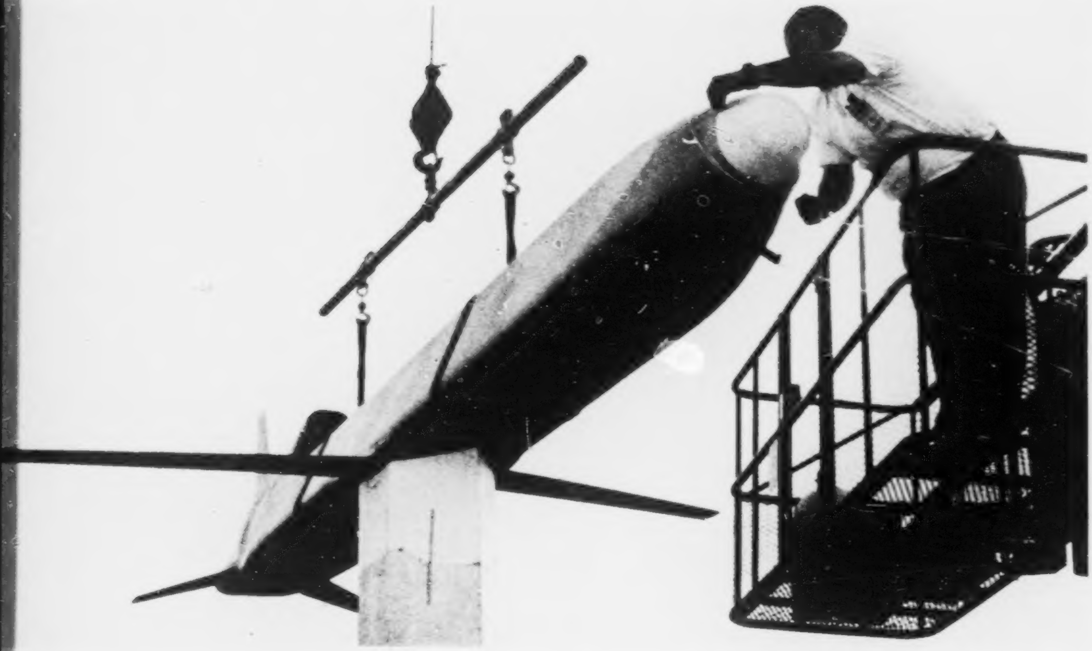
Source: Department of Defense Budget (Annually)
NOTE: Detail may not add to totals because of rounding.
E Estimate. Latest year reflects Administration's budget proposal.
r Revised.
Tr. Qtr. Transition Quarter: Until June 30, 1976, the fiscal years ran from July 1 to June 30. Beginning October 1, 1976, the fiscal years run from October 1 through September 30. A three-month "Transition Quarter" from July 1 through September 30, 1976 belongs to neither fiscal year.

SPECIFICATIONS OF U.S. MILITARY AIRCRAFT ON ORDER OR IN PRODUCTION AS OF 1985

Primary Mission, DOD Designation, & Popular Name	Manufacturer	U.S. Military Service	Crew	Empty Weight (000's lbs)	Engines	Performance Typical for Primary Mission	Remarks
ATTACK							
A-6E Intruder	Grumman	USN/USMC	2	27	2 × P&W J52	Mach .8 sea level	Also EA-6A/B & KA-6D
A-7K Corsair 2	LTV Aero.	ANG	2	21	1 × All TF 41	Subsonic	Trainer; combat capable
AV-8B Harrier 2	MDC/Br.Aer.	USMC	1	13	1 × RR F402	Mach .9 +	Graphite epoxy super-critical wing
A-10A Thunderbolt 2	Fairchild	USAF	1	22	2 × GE TF34	Max. speed 400kt.	Close air support
BOMBERS							
B-1B	Rockwell	USAF	4	182	4 × GE F101	High subsonic penetration	Intercont'l range, unrefueled
ELECTRONIC WARFARE							
EA-6B Prowler	Grumman	USN/USMC	4	33	2 × P&W J52	493n.m. standoff radius	Tactical jamming system
FIGHTERS							
F-5E Tiger 2	Northrop	USAF/USN	1	10	2 × GE J85	Mach 1.6 class	More than 1,200 F-5E/Fs delivered
F-5F Tiger 2	Northrop	USAF/USN	2	11	2 × GE J85	Mach 1.5 class	2-seat trainer/fighter
F-14A Tomcat	Grumman	USN	2	40	2 × P&W TF30	Mach 2.3 class	Missile, gun fleet defense
F-15C/D Eagle	MDC	USAF	1	31	2 × P&W F100	Mach 2.5 class	Air superiority, defense, guns, missiles; 15D = 2 seat trainer
F-16 Fighting Falcon	GD	USAF	1-2	15	1 × P&W F100	Mach 2 + class	Multirole fighter; fully fly-by-wire; missiles, guns
F/A-18 Hornet	MDC/Northrop	USN/USMC	1	24	2 × GE F404	Mach 1.8 +	Missiles, guns; also export
F-20 Tigershark	Northrop	Export	1	12	1 × GE F404	Mach 2 class	Multirole; adv. avionics
RECONNAISSANCE							
TR-1/U-2	Lockheed	USAF	1	18	1 × P&W J75	Altitudes 70,000 ft +	High alt. tactical recon.
PATROL ANTI-SUBMARINE WARFARE							
P-3C Orion	Lockheed	USN	10	67	4 × All T56	14 + hr. mission duration	Torpedoes, missiles, sonobuoys, mines, also export
EARLY-WARNING							
E-2C Hawkeye	Grumman	USN	5	38	2 × All T56	6 hr. mission duration	AEW command & control; passive detection
E-3A AWACS	Boeing	USAF/NATO	17	188	4 × P&W TF33	Long range, subsonic	Surveillance radar, command, control
CARGO-TRANSPORT							
C-2A Greyhound	Grumman	USN	2	34	2 × All T56	Cruise 260kt; 1,560n.m. range	First Navy multi-year procurement contract
C/KC-130 Hercules	Lockheed	USAF, USN, Export	4	74-78	4 × All T56	Cruise 385mph; 2,038n.m. range	92-128 troops or 39-43 thsnd. lbs.
C-5B Galaxy	Lockheed	USAF	6	363	4 × GE TF39	Cruise 563mph; 3,000n.m. range	Global strategic logistics; 261,000 lb. cargo capacity
C-9B Skytrain 2	MDC	USN	5-7	65	2 × P&W JT8D	Cruise 570mph; 3,300n.m. range	90 pass. or 32,444 lb. cargo
C-12 Huron	Beech	Army/USAF	2	8	2 × PWC PT6A	Cruise 259kt. at 14,000ft.	10-place; pass. or cargo
KC-10A Extender	MDC	USAF	5	241	3 × GE CF6	600 + mph.	Tanker or cargo
C-20A G3	Gulfstream	USAF	2	32	2 × RR Spey	Mach .77; 3,650 n.m.	VIP transport; 14 pass.
TRAINING							
T-34C Turbo Mentor	Beech	USN	2	3	1 × PWC PT6A	Cruise 211kt. at 17,500ft	Simulates jet a/c; weapons
T-46A	Fairchild	USAF	2	6	2 × GA F109	Cruise 370kt. at 25,000ft	Next Generation Trainer
HELICOPTERS							
AH-1T Sea Cobra	Bell-Textron	USN	2	9	2 × PWC T400	Max 218 mph; 360 mi.	TOW w/20 mm gun
AH-1S Cobra	Bell-Textron	Army	2	6	1 × Lyc T53	Max 195 mph; 380 mi.	TOW w/mini gun
AH-64 Apache	Hughes-MDC	Army	2	11	2 × GE T700	Max 197 mph; 445 mi.	Attack helicopter
CH-53E Super Stallion	Sikorsky-UTC	USN	3	33	3 × GE T64	Max 196 mph; 710 mi.	55 passengers, aux. tanks
SH-2F Seasprite	Kaman	USN	3	7	2 × GE T58	Max 165 mph; 400 mi.	LAMPS Mk.I helicopter
TH-57A Sea Ranger	Bell-Textron	USN	2	2	1 × All 250	Max 130 mph; 425 mi.	Primary trainer
SH-60B Seahawk	Sikorsky-UTC	USN	3	14	2 × GE T700	Max 171 mph	ASW
UH-1H Iroquois	Bell-Textron	Army	2	5	1 × Lyc. T53	Max 127 mph; 286 mi.	Succeeds UH-1D
UH-60A Black Hawk	Sikorsky-UTC	Army/USAF	3	11	2 × GE T700	Max 196 mph; 370 mi.	UTTAS

Source: Aerospace Industries Association, based on information from "Aviation Week & Space Technology Magazine."

CODE
Manufacturers: MDC = McDonnell Douglas; Br.Aer. = British Aerospace; GD = General Dynamics.
U.S. Military Service: USN = Navy; USMC = Marine Corps; USAF = Air Force; ANG = Air National Guard.
Engines: P&W = Pratt & Whitney; PWC = Pratt & Whitney of Canada; All = Detroit Diesel Allison Div. of General Motors; Lyc = Avco Lycoming; RR = Rolls Royce.



Industry production of missile systems increased sharply in 1985 after three years in which sales volume, after adjustment for inflation, showed little or no gain. According to Bureau of the Census reports, sales of missile systems and parts (excluding propulsion units and R&D work), reached a record level of $8.0 billion. The figure compares with $6.1 billion in 1984 and amounts to an increase of more than 30 percent.

The flow of new orders for missile systems also increased, but more moderately. The industry received new orders totaling $8.1 billion, up roughly five percent over 1984's $7.7 billion. Backlog at yearend 1985 was $10.2 billion, compared with $10.0 billion a year earlier.

The Bureau of the Census separately reported sales of missile-related engine and propulsion units at $2.5 billion, up from $2.3 billion in 1984; the figure includes propulsion systems for both civil and military space launch vehicles. Net new orders for propulsion systems amounted to $2.1 billion, well below the previous year's $3.8 billion. Backlog at the end of 1985 was $2.8 billion, down from $3.2 billion at the end of 1984.

As earlier planned by the Department of Defense, missile production in 1986/87 would have continued at approximately the 1985 pace; planned Fiscal Year 1987 procurement outlays were $12.6 billion, compared with $12.7 billion in the previous year. However, Congressional actions indicated that actual funding levels would be considerably below DoD requests. Although the DoD budget had not been finally resolved at publication time, committee recommendations in both the House and Senate suggested an overall DoD budget reduction of about $30 million and significant cuts in many—but not all—missile procurement programs. DoD's procurement plan, therefore, serves only as a general indicator of program scopes and priorities.

On the basis of such plans, missile programs with the highest dollar value in FY 1987 were the Air Force's Peacekeeper ICBM ($1.5 billion), the Navy's sub-launched Trident II Fleet Ballistic Missile ($1.4 billion) and the Army's Patriot long range air defense system ($1.0 billion). The USAF planned procurement of 21 additional Peacekeepers following 21 in FY 1985 and 12 in FY 1986. Trident II funding for initial production of 21 missiles was requested. The Army planned additional procurement of 700 Patriot units.

Missile Programs

86 87

Other major missiles in production during 1985/86 included (in order of planned FY 1987 dollar value):

Army. The Multiple Launch Rocket System, a mobile rocket battery operational since 1983; the Stinger man-portable short range antiaircraft weapon; the TOW 2 Army/Marine Corps antitank weapon; the Chaparral, an infrared homing surface-to-air missile; the Pershing II battlefield ballistic missile, operationally deployed in Europe; and the Laser Hellfire, a long range helicopter-borne antiarmor missile for both Army and Navy use.

Navy. The Navy's largest procurement program, after Trident II, is the Tomahawk cruise missile, which can be deployed from aircraft, surface ships, submarines or land platforms. Among other Navy programs are the HARM (High-speed Anti-Radiation Missile), an air-to-surface weapon designed to destroy enemy radars; the Standard ship defense surface-to-air missile, built in four different versions; the Phoenix long range air-to-air missile; the radar-guided Sparrow air-to-air weapon carried by both Navy and Air Force aircraft; and the Laser Maverick, a Marine Corps close support air-to-surface missile.

Air Force. In addition to the Peacekeeper, missiles under Air Force procurement cognizance include the AMRAAM (Advanced Medium Range Air-to-Air Missile), planned for initial production in FY 1987; the Infrared Imaging Maverick air-to-surface USAF/Navy weapon; and the Tomahawk Ground Launched Cruise Missile. □

MISSILE PROGRAM PROCUREMENT INCLUDING INITIAL SPARES[a]

Fiscal Years 1985, 1986 and 1987
(Millions of Dollars)

Agency, Type and Model	1985		1986[E]		1987[E]	
	No.	Cost	No.	Cost	No.	Cost
AIR FORCE						
AGM-130	—	$ —	5	$ 19.0	159	$ 27.4
ALCM	—	77.3	—	32.6	—	12.4
AMRAAM[b]	—	73.1	—	209.0	260	756.8
GLCM	120	576.9	95	516.4	76	141.4
IIR Maverick[b]	2,600	377.5	2,795	434.9	5,119	638.9
Peacekeeper (M-X)[j]	21	990.8	12	1,776.8	21	1,473.5
Rapier	—	3.6	—	7.6	—	6.4
NAVY						
Harm[b]	1,684	$ 590.0	2,275	$ 656.3	3,240	$ 767.6
Harpoon[b]	439	350.5	370	306.2	94	153.8
Hawk[e]	500	126.0	550	122.8	430	115.4
Laser Maverick[e]	600	103.0	1,500	167.2	1,800	201.7
Phoenix	265	441.1	265	353.3	205	321.5
RAM	—	20.4	—	—	50	63.2
Sidearm[i]	—	—	200	29.1	256	23.0
Sidewinder[b]	1,000	77.4	3,770	184.3	2,337	161.3
Sparrow[b]	2,082	362.5	2,445	424.5	2,095	345.3
Standard	1,384	754.0	1,316	873.9	1,194	747.6
Tomahawk	180	581.0	249	767.8	324	835.6
Trident I	—	123.2	—	34.4	—	4.7
Trident II	—	162.9	—	550.9	21	1,426.0
VLA	—	—	—	—	200	75.1
ARMY						
Chaparral	—	$ 31.0	24	$ 116.6	456	$ 105.6
Laser Hellfire[d]	6,218	250.7	7,054	276.1	—	1.2
MLRS	50,472	529.0	72,000	532.7	72,000	484.7
Patriot	440	1,053.7	585	1,020.6	700	1,033.9
Pershing II[k]	70	382.2	—	224.5	—	31.8
Stinger[f]	3,216	280.1	4,239	304.5	6,307	415.9
TOW-2[c]	15,822	258.2	16,938	235.3	15,400	187.9

Source: "Program Acquisition Costs by Weapon System," Department of Defense Budget (Annually).
NOTE See Research and Development Chapter for missile program RDT&E authorization data.
[E] Estimate. Latest year reflects Administration's budget proposal.
[a] Total Obligational Authority.
[b] Navy and Air Force funding.
[c] Army and Marine Corps funding.
[d] Army and Navy funding.
[e] Marine Corps funding.
[f] Army, Marine Corps and Air Force funding.
[g] Includes ground control stations.
[h] Navy, Marine Corps and Air Force funding.
[i] Navy and Marine Corps funding.
[j] Funding in the amount of $1.5 billion for the 21 missiles in FY 1985 will be provided from prior year programs.
[k] Fiscal Year 1986 Quantity is Classified.

MAJOR MISSILES
RESEARCH, DEVELOPMENT, PRODUCTION, OPERATION

Program	Agency	Status	Systems Contractor(s)	Propulsion Manufacturer	Guidance Manufacturer
AIR-TO-AIR					
AMRAAM	USAF/USN	D	Hughes	Hercules	Hughes
Falcon	USAF	O	Hughes	Morton Thiokol	Hughes
Phoenix-54A	USN	O	Hughes	Hercules	Hughes
Phoenix-54C	USN	P	Hughes	Hercules	Hughes
Sidewinder-9H	USN	O	NASC	Bermite/Hercules	Ford Aero./Raytheon
Sidewinder-9J	USAF	O	Ford Aerospace	Hercules/Aerojet	Ford Aerospace
Sidewinder-9L	USN/USAF	O	NASC	Bermite/Hercules	Raytheon/Ford Aero.
Sidewinder-9M	USN/USAF	P	NASC	Morton Thiokol/Hercules	Raytheon/Ford Aero.
Sidewinder-9N	USAF	O	Ford Aero.	—	Ford Aero.
Sidewinder-9P	USAF	O	Ford Aero.	Hercules/Aerojet	Ford Aero.
Sparrow-7E	USN/USAF	O	Raytheon	Hercules/Aerojet	Raytheon
Sparrow-7F	USN/USAF	O	NASC	Hercules	Raytheon/GD
Sparrow-7M	USN/USAF	P	Raytheon/GD	Hercules	Raytheon/GD
AIR-TO-SURFACE					
ALCM	USAF	P	Boeing	Williams International	Honeywell/Litton
HARM	USN/USAF	P	Texas Instr.	Morton Thiokol	Texas Instr.
Harpoon*	USN	P,O	McDonnell Douglas	Teledyne CAE	TI/IBM/LSI/Northrop
GBU-15	USAF	P	Rockwell	—	Hughes/Rockwell
Maverick-65A/B	USAF	P,O	Hughes	MTI/Aerojet	Hughes
Maverick-65D	USAF	P,O	Hughes	MTI/Aerojet	Hughes
Maverick-65E	USMC	P	Hughes	MTI/Aerojet	Hughes
Maverick-65F	USN	D	Hughes	MTI/Aerojet	Hughes
Shrike	USN/USAF	O	NWC/PMTC	Aerojet/Hercules	Texas Instruments
SRAM	USAF	O	Boeing	Lockheed	Singer
Standard ARM	USN/USAF	O	GD	NOSIH	GD
Walleye 1	USN	O	Martin Marietta	—	Martin Marietta/Hughes
Walleye 1ER	USN	R,D	NAC	—	NAC
Walleye 2	USN	O	NAC	—	NAC
Walleye 2 (ER/DL)	USN	O	NAC	—	NAC

*Also Surface-to-Surface

(Continued on next page)

MAJOR MISSILE PROGRAMS (Continued)

Program	Agency	Status	Systems Contractor(s)	Propulsion Manufacturer	Guidance Manufacturer
AIR-TO-SURFACE (Cont'd.)					
AGM-130A	USAF	D	Rockwell	Hercules	Hughes
AGM-130B	USAF	D	Rockwell	Hercules	Hughes
ANTI-SUBMARINE					
Subroc	USN	O	Goodyear Aerospace	Morton Thiokol	Singer
SURFACE-TO-AIR					
Chaparral	Army	O	Ford Aerospace	Hercules/ Bermite	GE/Raytheon
Improved Chaparral	Army	P,O	Ford Aerospace	Bermite	Ford Aerospace
Hawk	Army	P,O	Raytheon/ Northrop	Aerojet	Raytheon
Patriot	Army	P	Raytheon/MM	Morton Thiokol	Raytheon
RAM	USN	D	General Dynamics	Bermite/ Hercules/ MTI	General Dynamics
Redeye	Army/ USMC	O	General Dynamics	Atlantic Research	General Dynamics
Roland	Army	P,O	Hughes/ Boeing	Hercules	Hughes/ Boeing
Sea Sparrow	USN	P,O	Raytheon/ GD	Aerojet/ Hercules	Raytheon/ GD
Standard MR (SM-1)	USN	P,O	General Dynamics	Aerojet	General Dynamics
Standard MR (SM-2)	USN	P,O	General Dynamics	Aerojet/ Hercules/ MTI	General Dynamics
Standard ER (SM-1)	USN	O	General Dynamics	Atlantic Research	General Dynamics
Standard ER (SM-2)	USN	P,O	General Dynamics	Atlantic Research/ MTI	General Dynamics
Stinger	Army/ USMC	P,O	General Dynamics	Atlantic Research	General Dynamics
Tartar	USN	O	GD	Aerojet	GD
Terrier	USN	O	General Dynamics	Atlantic Research	General Dynamics
SURFACE-TO-SURFACE					
Harpoon*	USN	P,O	McDonnell Douglas	Teledyne CAE	TI/IBM/LSI/ Northrop
Minuteman 2	USAF	O	AFLC Hill AFB/ Boeing	MTI/Aerojet/ Hercules/	Rockwell Autonetics
Minuteman 3	USAF	O	AFLC Hill AFB/ Boeing	MTI/ Aerojet	Rockwell Autonetics

*Also Air-to-Surface

(Continued on next page)

MAJOR MISSILE PROGRAMS (Continued)

Program	Agency	Status	Systems Contractor(s)	Propulsion Manufacturer	Guidance Manufacturer
SURFACE-TO-SURFACE (Cont'd.)					
Peacekeeper (MX)	USAF	P,D	BMO/TRW/Martin Marietta	MTI/Avco/Aerojet/Hercules/Rocketdyne	Rockwell/Northrop/Honeywell
Polaris A3	USN	O	Lockheed MSC	Aerojet/Hercules	GE/Hughes/MIT/Raytheon
Poseidon C3	USN	O	Lockheed MSC	MTI/Hercules	GE/MIT/Hughes Raytheon
Tomahawk (SLCM)	USN	P	GD/MDC	Williams International	MDC/GD
Tomahawk (GLCM)	USAF	P	GD/MDC	Williams International	MDC/GD
Titan 2	USAF	O	AFLC Hill AFB/MM	Aerojet	GM/Delco Electronics
Trident C4	USN	P,O	Lockheed MSC	Hercules/MTI	GE/Draper/Raytheon/Hughes
BATTLEFIELD SUPPORT AND ANTIARMOR					
Dragon	Army	P,O	Raytheon/MDC	MDC/Hercules/Raytheon	Raytheon
Hellfire	Army/USMC	P	Rockwell	Morton Thiokol	Martin Marietta
Lance	Army	O	Vought	RI Rocketdyne	E-Systems/Sys-Donner/Arma
MLRS	Army	P,O	Vought.	Atlantic Res.	—
Pershing 1A	Army	O	Martin Marietta	Morton Thiokol	Allied Bendix
Pershing 2	Army	P	Martin Marietta	Hercules	Goodyear Aerospace
Shillelagh	Army	O	Ford Aerospace	Hercules	Ford Aerospace
TOW	Army	O	Hughes	Hercules	Emerson El.
ITOW	Army	P,O	Hughes	Hercules	Emerson El.
TOW2	Army	P,O	Hughes	Hercules/MTI	Emerson El.

Source: Aerospace Industries Association, based on information from "Aviation Week & Space Technology Magazine."
Status: R—Research; D—Development; P—Production; O—Operational.

Abb:
AFB - Air Force Base
AFLC - Air Force Logistics Cmd.
BMO - Ballistic Missile Office
GD - General Dynamics
GE - General Electric
LSI - Lear Siegler
MM - Martin Marietta
MDC - McDonnell Douglas
MIT - Massachusetts Institute of Technology
MTI - Morton Thiokol, Inc.
NAC - Naval Avionics Center
NASC - Naval Air Systems Command
NWC - Naval Weapons Center
PMTC - Pacific Missile Test Center
RI - Rockwell International
TI - Texas Instruments
USAF - United States Air Force
USMC - United States Marine Corps
USN - United States Navy

DEPARTMENT OF DEFENSE OUTLAYS FOR MISSILE PROCUREMENT[a]

By Agency
Fiscal Years 1961-1987
(Millions of Dollars)

Year	TOTAL MISSILE PROCUREMENT[a]	Air Force	Navy[a]	Army
1961	$ 2,972	$1,922	$ 493	$ 557
1962	3,442	2,385	593	464
1963	3,817	2,676	718	423
1964	3,577	2,100	981	496
1965	2,096	1,320	522	254
1966	2,069	1,313	512	244
1967	1,930	1,278	432	220
1968	2,219	1,388	436	395
1969	2,509	1,382	534	593
1970	2,912	1,467	702	743
1971	3,140	1,497	791	852
1972	3,009	1,334	831	844
1973	3,023	1,454	628	941
1974	2,981	1,537	541	903
1975	2,889	1,602	615	672
1976	2,296	1,549	584	163
Tr. Qtr.	402	347	148	(93)
1977	2,781	1,501[r]	905	374
1978	3,096	1,376	1,302	418
1979	3,786	1,537	1,702	547
1980	4,434	1,810	1,973	651
1981	5,809	2,366[r]	2,297	1,146
1982	6,782	3,069	2,444	1,269
1983	7,795	3,383	2,812	1,600
1984	9,527	4,640	2,809	2,079
1985	10,749	5,409	2,941	2,399
1986[E]	12,723	6,613	3,781	2,329
1987[E]	12,647	6,490	3,828	2,329

Source: Department of Defense Budget (Annually).

NOTE: Detail may not add to totals because of rounding.

[a] Revised by AIA from previously published data to include Navy Weapons Procurement in Total Missile Procurement. Beginning 1978, DOD combined Navy Missile Procurement with torpedoes and other related products into Navy Weapons Procurement. Missiles comprise approximately 80 percent of the value of this category.

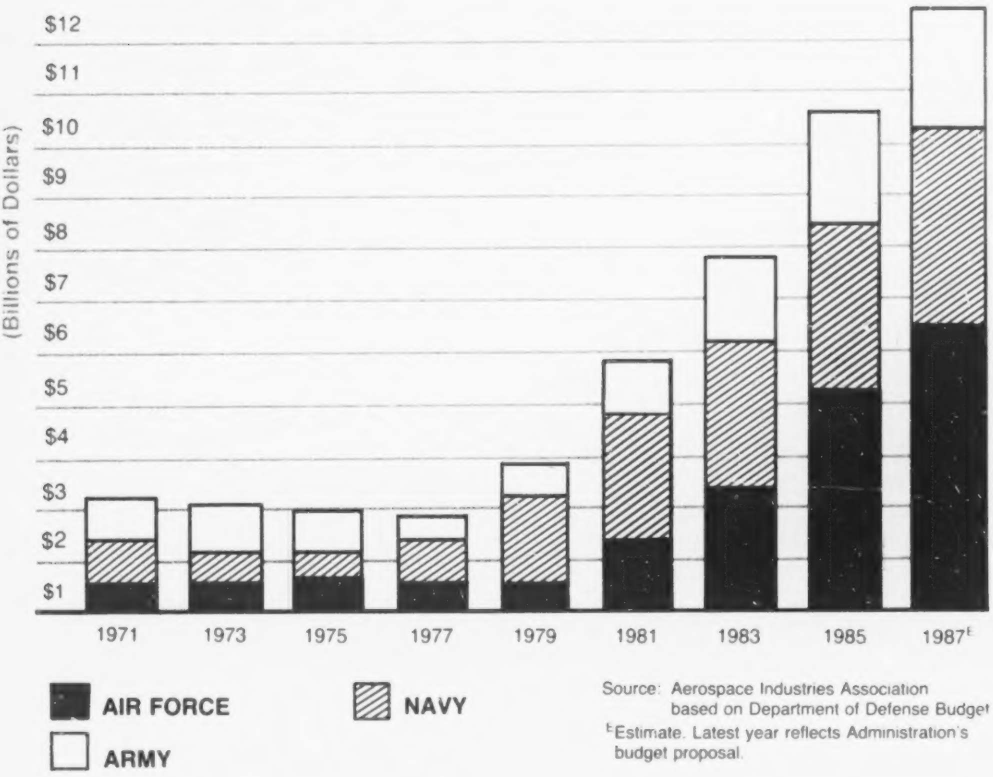
[E] Estimate. Latest year reflects Administration's budget proposal.

[r] Revised.

Tr. Qtr. Transition Quarter: Until June 30, 1976, the fiscal years ran from July 1 to June 30. Beginning October 1, 1976, the fiscal years run from October 1 through September 30. A three-month "Transition Quarter" from July 1 through September 30, 1976 belongs to neither fiscal year.

DEPARTMENT OF DEFENSE OUTLAYS FOR MISSILE PROCUREMENT

By Agency
Fiscal Years 1971-1987

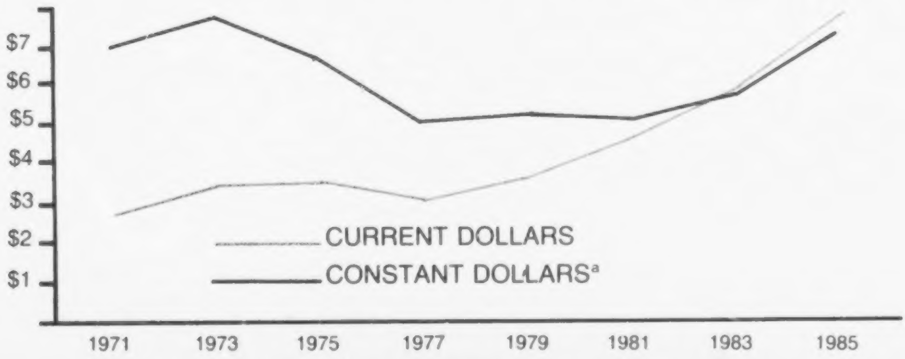


Source: Aerospace Industries Association based on Department of Defense Budget

E Estimate. Latest year reflects Administration's budget proposal.

SALES OF MISSILE SYSTEMS AND PARTS

Calendar Years 1971-1985



Source: Aerospace Industries Association based on Bureau of Census data.

[a] Based on revised aerospace composite deflator (1982 = 100)

ORDERS, SALES, AND BACKLOG MISSILE SYSTEMS AND PARTS[a]

Calendar Years 1971-1985
(Millions of Dollars)

Year	SALES-Current Dollars	SALES-Constant Dollars[c]
1971	$2,641	$6,950
1972	3,335	8,685
1973	3,391	7,904
1974	3,454	7,318
1975	3,548	6,694
1976	3,237	5,581
1977	3,118	5,021
1978	3,264[b]	4,991
1979	3,706	5,126
1980	3,971	4,945
1981	4,662	5,157
1982	5,676	5,676
1983	5,991	5,711
1984	6,094	5,601
1985	7,975	7,257

Year	NET NEW ORDERS	BACKLOG AS OF DECEMBER 31
1971	$3,264	$3,344
1972	3,633	3,642
1973	3,617	3,868
1974	4,059	4,473
1975	3,655	4,580
1976	3,036	4,379
1977	3,280	4,541
1978	2,948	4,581
1979	3,724	4,916
1980	4,961	5,558
1981	6,030	6,749
1982	6,034	7,107
1983	7,231	8,406
1984	7,731	10,043
1985	8,122	10,190

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)," Series MA37D (Annually).

[a] Prior to 1980, includes space vehicle systems and parts sold to other than U.S. Government customers.

[b] AIA estimate based on MQ37D.

[c] Based on revised aerospace composite price deflator (1982 = 100).

[r] Revised.

ORDERS, SALES, AND BACKLOG ENGINES AND PROPULSION UNITS FOR MISSILES AND SPACE VEHICLES[a]

Calendar Years 1971-1985
(Millions of Dollars)

Year	SALES-Current Dollars			SALES-Constant Dollars[c]		
	TOTAL	Military[b]	Non-Military	TOTAL	Military[b]	Non-Military
1971	$ 605	$ 596	$ 9	$1,592	$1,568	$ 24
1972	607	596	11	1,581	1,552	29
1973	627	607	20	1,462	1,415	47
1974	649	633	16	1,375	1,341	34
1975	643	626	17	1,213	1,181	32
1976	641	621	20	1,105	1,071	34
1977	787	757	30	1,267	1,219	48
1978	792	760	32	1,211	1,162	49
1979	952	915	37	1,317	1,266	51
1980	939	661	278	1,169	823	346
1981	1,204	786	418	1,332	869	462
1982	1,555	899	656	1,555	899	656
1983	1,814	951	863	1,729	907	823
1984	2,305	1,116	1,189	2,119	1,026	1,093
1985	2,466	1,256	1,210	2,244	1,143	1,101

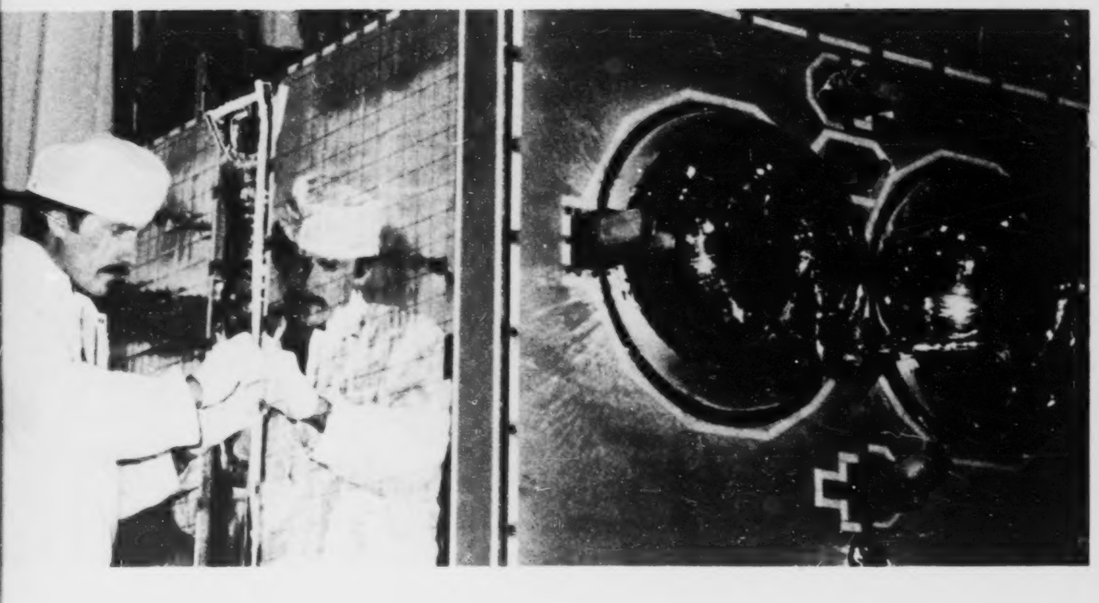
Year	NET NEW ORDERS			BACKLOG AS OF DECEMBER 31		
	TOTAL	Military[b]	Non-Military	TOTAL	Military[b]	Non-Military
1971	$ 508	$ 499	$ 9	$ 520	$ 513	$ 7
1972	758	742	16	671	659	12
1973	581	563	18	625	615	10
1974	702	680	22	678	662	16
1975	496	481	15	531	517	14
1976	783	763	20	673	659	14
1977	727	693	34	613	595	18
1978	967	919	48	788	754	34
1979	1,187	1,141	46	1,024	980	44
1980	1,121	653	568	1,284	871	413
1981	1,284	746	538	1,343	828	515
1982	2,112	1,134	978	1,901	1,063	838
1983	1,618	942	676	1,691	1,052	639
1984	3,770	2,258	1,512	3,156	2,194	962
1985	2,112	1,323	789	2,802	2,261	541

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)," Series MA37D (Annually).

[a] See table in Space Programs Chapter for Orders, Sales, and Backlog, Space Vehicle Systems.

[b] Prior to 1980 includes figures for nonmilitary U.S. Government customers.

[c] Based on revised aerospace composite price deflator (1982 = 100).



In 1985, industry sales of space equipment increased more than 20 percent in current dollar terms and about 19 percent in inflation-adjusted constant dollars, continuing the rapid growth in evidence since the latter 1970s. According to Bureau of the Census figures, combined civil/military space sales, excluding propulsion systems, reached a record $6.3 billion (current dollars), up from $5.2 billion in 1984.

The increase was due entirely to continuing expansion of military space activity, which accounted for $4.2 billion or two-thirds of the total; the dollar value compares with $3.0 billion in 1984. Sales to non-military customers, including NASA, other government agencies and commercial sales, amounted to $2.1 billion, a decline from 1984's $2.2 billion.

Net new orders received during 1985 totaled $6.8 billion, compared with $5.0 billion in the preceding year. Here again military programs dominated, with orders amounting to $4.5 billion compared with $2.3 billion in non-military orders. Both figures represented substantial increases over 1984. The backlog for space equipment (again excluding propulsion units) was $5.2 billion at yearend 1985, up from $4.6 billion at the end of 1984. More than 66 percent of the backlog was in military orders.

Outlays for federal space activities in Fiscal Year 1986 were estimated at $20.6 billion, including $13.1 billion for the Department of Defense and $7.2 billion for NASA; the corresponding figures for 1985 were $17.6 billion total, $10.4 billion DOD, $6.6 billion NASA.

The total impact of the January 1986 *Challenger* disaster was not completely measureable at publication time, due to pending Congressional, NASA and DoD decisions relative to readjustment in the Challenger aftermath. One result was the postponement of Space Shuttle operations from Vandenberg Air Force Base, California until 1992. This will inevitably stretch out Shuttle-related military satellite programs and in some cases necessitate redesign so that the payloads can be launched by expendable launch vehicles (ELVs). But since DoD had been planning an expanded ELV capability before the *Challenger* accident and was able to initiate ELV procurement in the summer of 1986, it appeared that industry's activity in military space would be less affected than would its NASA-related projects.

NASA's recovery plan envisioned resumption of Shuttle flights in February 1988, a target felt optimistic by industry observers. The delay will have considerable impact on Shuttle-related payload fabrication by indus-

Space Programs

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try. A more far-reaching question is whether the replacement Orbiter will be funded separately from NASA's regular budget in Fiscal Years 1988-91 or whether NASA will have to absorb the $3 billion cost within an already tight allocation. The latter eventuality would have tremendous impact on all programs and could postpone initial operational occupancy of the NASA/international Space Station for several years.

Aside from the Space Station, major NASA development programs active in 1986 included two of the "Great Observatories" series, the Advanced X-ray Astrophysics Facility and the Gamma Ray Observatory, both planned for service in the 1990s; the Solar Optical Telescope, a Shuttle-based system; the Venus Radar Mapper, earlier planned for 1989 launch; and the Ocean Topography Experiment (TOPEX), experimental forerunner of a future ocean observation system. Once planned for 1986 launch, the Hubble Space Telescope, first of the Great Observatories, and the Galileo Jupiter orbiter/probe were completed in 1986 and stored for priority launch when Shuttle operations resume.

The major defense space-related program is the Strategic Defense Initiative, a broad research and development effort designed to investigate the potential of a number of advanced technologies that might be applicable to a future system for intercepting incoming ballistic missiles. Among unclassified military space programs in development are the Navstar Global Positioning System, a network of navigational satellites; the DCSC-III advanced communications satellite system; and the Milstar extremely high frequency, highly survivable communications satellite.□

U.S. SPACECRAFT RECORD[a]

Calendar Years 1957-1985

Year	Earth Orbit[b]		Earth Escape[b]		Year	Earth Orbit[b]		Earth Escape[b]	
	Success	Failure	Success	Failure		Success	Failure	Success	Failure
1957	0	1	0	0	1972	33	2	8	0
1958	5	8	0	4	1973	23	2	3	0
1959	9	9	1	2	1974	27	2	1	0
1960	16	12	1	2	1975	30	4	4	0
1961	35	12	0	2	1976	33	0	1	0
1962	55	12	4	1	1977	27	2	2	0
1963	62	11	0	0	1978	34	2	7	0
1964	69	8	4	0	1979	18	0	0	0
1965	93	7	4	1	1980	16	4	0	0
1966	94	12	7	1[c]	1981	20	1	0	0
1967	78	4	10	0	1982	21	0	0	0
1968	61	15	3	0	1983	31	0	0	0
1969	58	1	8	1	1984	35	3	0	0
1970	36	1	3	0	1985	37	1	0	0
1971	45	2	8	1					
					TOTAL	1,101	138	79	15

Source: NASA, "Aeronautics and Space Report of the President," (Annually).

[a] Payloads, rather than launchings; some launches account for multiple spacecraft. Includes spacecraft from cooperating countries launched by U.S. launch vehicles.

[b] The criterion of success or failure used is attainment of earth orbit or earth escape rather than judgment of mission success. "Escape" flights include all that were intended to go at least an altitude equal to lunar distance from the earth.

[c] This earth-escape failure did attain earth orbit and therefore is included in the earth-orbit success totals.

WORLDWIDE SPACE LAUNCHINGS WHICH ATTAINED EARTH ORBIT OR BEYOND[a]

Calendar Years 1957-1985

Country	Total 1957-1985	1981	1982	1983	1984	1985
TOTAL	2,763	123	121	127	129	121
U.S.S.R.	1,831	98	101	98	97	98
United States	853	18	18	22	22	17
Japan	29	3	1	3	3	2
People's Republic of China	15	1	1	1	3	1
European Space Agency	12	2	—	2	4	3
India	3	1	—	1	—	—
Other[b]	20[b]	—	—	—	—	—

Source: National Aeronautics and Space Administration, "Aeronautics and Space Report of the President," (Annually).

[a] Number of launchings rather than spacecraft; some launches orbited multiple spacecraft.

[b] Includes 10 by France, 8 by Italy (5 were U.S. spacecraft), 1 by Australia, and 1 by the United Kingdom.

SUCCESSFUL U.S. LAUNCHES

Calendar Year 1985

Launch Date, Spacecraft, and Launch Vehicle	Objectives and Remarks
Jan. 24 Defense Discovery (STS-51C) Space Shuttle	SPACE TRANSPORTATION SYSTEM: fifteenth operational flight, shuttle orbiter carrying DoD experiments, DoD satellites to develop spacecraft techniques and technology. Spacecraft not announced. Still in orbit.
Feb. 8 Defense Titan IIIB	DOD SATELLITES: to develop spacecraft techniques and technology. Spacecraft not announced. Still in orbit.
Mar. 13 Geosat Atlas E	GEODESY SATELLITE: to measure accurately small variations in ocean surface height.
Mar. 22 Intelsat V-A F-10 Atlas-Centaur	COMMUNICATIONS SATELLITE: launched by NASA for the International Telecommunications Satellite Organization (Intelsat). Satellite was to be placed in geosynchronous orbit for Intelsat to provide 13,500 two-way voice circuits plus two televison channels.
Apr. 12 Discovery (STS-51D) Telesat-1 (Apr. 12) Syncom IV-3 (Apr. 13) Space Shuttle	SPACE TRANSPORTATION SYSTEM: sixteenth operational flight. Shuttle carried two satellites, Telesat-1 and Syncom IV-3, in addition to two Get Away Specials (GAS), continuous Flow Electrophoresis System (CFES III) American Flight Echocardiograph (AFE) and two student experiments. Syncom deployed successfully, but sequencer failed to start. Satellite remained inoperable until restarted by crew of STS-51I, Sept. 1.
Apr. 29 Challenger (STS-51B) NUSAT-1 GLOMP Space Shuttle	SPACE TRANSPORTATION SYSTEM: seventeenth operational flight. Deployed Northern Utah Satellite (NUSAT). Global Low Orbiting Message Relay Satellite (GLOMP), failed to deploy and returned to earth with orbiter. Carried Spacelab 3 long habitable module.
June 17 Discovery (STS-51G) MORELOS A (June 17) Arabsat 1B (June 18) Telstar 3D (June 19) Spartan 1 (June 20) Space Shuttle	SPACE TRANSPORTATION SYSTEM: eighteenth operational flight. Deployed MORELOS A, a communications satellite for Mexico, Arabsat, communications satellite for Arab Satellite Communication Organization (ASCO) and Telstar 3D for the American Telephone and Telegraph Co. (AT&T). Launched and retrieved Spartan 1, first in a series of low-cost free flyers designed to extend capabilities of sounding rocket class experiments. Carried Automated Directional Solidification Furnace (ADSF), French Echocardiograph Experiment (FEE), French Postural Experiment (FPE), Arabsat Scientific Experiments (ASE) and six Getaway Specials (GAS).
June 30 Intelsat V-A F-11 Atlas-Centaur	COMMUNICATIONS SATELLITE: second in a series of improved INTELSAT COMMERCIAL COMMUNICATIONS SATELLITES.

(Continued on next page)

SUCCESSFUL U.S. LAUNCHES (Continued)

Calendar Year 1985

Launch Date, Spacecraft, and Launch Vehicle	Objectives and Remarks
July 29 Challenger (STS-51F) Space Shuttle	SPACE TRANSPORTATION SYSTEM: nineteenth operational flight. Carried Spacelab-2 and deployed and retrieved Plasma Diagnostic Package. Spacelab-2 experiments: Solar Magnetic and Velocity Field Measurement System/Solar Optical Universal Polarimeter (SOUP), Coronal Helium Abundance Spacelab Experiment (CHASE), Solar Ultraviolet High Resolution Telescope and Spectrograph (HRTS), Solar Ultraviolet Spectral Irradiance Monitor (SUSIM), Vehicle Charging and Potential Experiment (VCAP), Plasma Depletion Experiments for Ionospheric and Radio Astronomical Studies, Elemental Composition and Energy Spectra of Cosmic Ray Nuclei Between GeV/Nucleon and Several TeV/Nucleon (CRN), Hard X-Ray Imaging of Clusters of Galaxies and Other Extended X-Ray Sources/X-Ray Telescope (XRT), Small Helium-Cooled Infrared Telescope (IRT), Properties of Superfluid Helium in Zero-Gravity, Vitamin D Metabolites and Bone Demineralization, Gravity-Influenced Lignification in Higher Plants/Plant Growth Unit (PGU). Additional experiments: Protein Crystal Growth, Plant Growth Unit (PGU). Shuttle Amateur Radio Experiment (SAREX), Carbonated Beverage Dispenser Evaluation (CBDE).
August 3 Oscar 24 Oscar 30 Scout	NAVIGATION SATELLITES: part of Navy Transit System.
August 27 Discovery (STS-51I) AUSSAT-1 ASC-1 Syncom IV-4 (Aug. 29) Space Shuttle	SPACE TRANSPORTATION SYSTEM: twentieth operational flight. Successfully deployed three communications satellites: AUSSAT-1 launched for Australia's National Satellite Company, ASC-1 launched for American Satellite Company and Syncom IV-4 launched for U.S. Navy which subsequently ceased functioning. Also carried Physical Vapor Transport and Organic Solids (PVTOS) experiment.
Sept. 29 Intelsat V-A F-12 Atlas-Centaur	COMMUNICATIONS SATELLITE: last INTELSAT commercial communications satellite launched by NASA for INTELSAT.
Oct. 3 Atlantis (STS-51J) Defense Space Shuttle	SPACE TRANSPORTATION SYSTEM: twenty first operational flight, shuttle orbiter carrying DoD experiments and satellites. Spacecraft not announced.
Oct. 9 Navstar-11 Atlas E	NAVIGATION SATELLITE: system satellite launched by DoD in joint military services developmental network.

(Continued on next page)

SUCCESSFUL U.S. LAUNCHES (Continued)

Calendar Year 1985

Launch Date, Spacecraft, and Launch Vehicle	Objectives and Remarks
Oct. 30 Challenger (STS-61A) GLOMR Space Shuttle	SPACE TRANSPORTATION SYSTEM: twenty second operational flight. Conducted experiments, carried Spacelab D-1 long module plus Mission Peculiar Equipment Support Structure, successfully deployed Global Low Orbiting Message Relay Satellite (GLOMR).
Nov. 27 Atlantis (STS-61B) MORELOS-B AUSSAT-2 RCA Satcom K-2 (Nov. 28) Space Shuttle	SPACE TRANSPORTATION SYSTEM: twenty third operational flight. Successfully deployed: MORELOS-B, second of two satellites launched for Secretariat of Communications and Transportation, Mexico, AUSSAT-2 second in a series of three communications satellites launched for the Australian National Satellite Communications System and RCA Satcom K-2 second in a series of three satellites for RCA American Communications, Inc. Also carried: Experimental Assembly of Structures with Extravehicular Activity (EASE), Assembly Concept for Construction of Erectable Space Structure (ACCESS), IMAX Camera, Continuous Flow Electrophoresis System (CFES III), Diffusive Mixing of Organic Solutions (DMOS), Morelos Payload Specialists Experiments (MPSE), 1 Getaway Special (GAS).
Dec. 13 Defense Scout	DOD SATELLITE: launched by NASA for the Air Force. Spacecraft not announced.

Source NASA, Historian's Office

U.S. SPACE LAUNCH VEHICLES

As of 1985

Vehicle and Initial Launch & First Launch of this Modification	Stages	Thrust (Kilo-newtons)	Maximum Payload (Kg)[a]		
			185-Km Orbit	Geo-synch.-Transfer Orbit	Circular Sun-Synch. Orbit
Scout (1960; 1979)	1. Algol IIIA* 2. Castor IIA* 3. Antares IIIA* 4. Altair IIIA*	431.1 285.2 83.1 25.6	255 205[b]	—	155[b]
Delta 2900 Series (Thor-Delta) (1960; 1973)	1. Thor plus 9 TX 354-5* 2. Delta 3. TE 364-4*	912.0 147[c] 44.2 65.8	2,000 1,410[b]	705	1,250[b]
Delta 3900 Series (Thor-Delta)[d] (1960; 1982)	1. Thor plus 9 TX 526-2* 2. Delta	912.0 375[c] 44.2	3,045 2,180[b]	1,275	2,135[b]
Atlas E (1967; 1972)	1. Atlas booster & sustainer	1,722.0	2,090[b,e]	—	1,500[b]
Atlas-Centaur (1962; 1984)	1. Atlas booster & sustainer 2. Centaur	1,913.0 146.0	6,100	2,360[h]	—

Vehicle and Launch Date	Stages	Thrust (Kilo-newtons)	Maximum Payload (Kg)[a]		
			185-Km Orbit	Direct Geo-synch Orbit	Sun-Synch. Transfer Orbit
Titan IIIB-Agena (1966)	1. LR-87 2. LR-91 3. Agena	2,341.0 455.1 71.2	3,600[b]	—	3,060[b]

(Continued on next page)

U.S. SPACE LAUNCH VEHICLES

As of 1985 (Continued)

Vehicle and Launch Date	Stages	Thrust (Kilonewtons)	Maximum Payload (Kg)[a]		
			185-Km Orbit	Direct Geo.-Synch. Orbit	Sun Synch. Transfer Orbit
Titan III(34)D/IUS (1983)	1. Two 5½-segment 3.05-m. dia*	11,564.8	14,920	1,850[b]	—
	2. LR-87	2,366.3			
	3. LR-91	449.3			
	4. IUS 1st stage*	275.8			
	5. IUS 2nd stage*	115.7			
Titan III(34)D/ Transtage (1984)	1. Two 5½-segment 3.05-m. dia*	11,564.8	14,920	1,850[b]	—
	2. LR-87	2,366.3			
	3. LR-91	449.3			
	4. Transtage	69.8			
Space Shuttle (reusable) (1981)	1. Orbiter; 3 main engines (SSMEs) fire in parallel with SRBs	1,670[c]	29,500 in full performance configuration (280-420 km orbit)		
	2. Two solid-fueled rocket boosters (SRBs) mounted on external tank (ET) fire in parallel with SSMEs	11,790[c]			

Source: NASA, "Aeronautics and Space Report of the President" (Annually) and NASA Historian's office.

* Solid propellant; all others are liquid.

[a] Due east launch except as indicated.

[b] Polar launch.

[c] Each.

[d] Maximum performance based on 3920 and 3920/PAM (payload assist module) configurations.

[e] With dual TE 364-4.

[f] 96° flight azimuth.

U.S. MANNED SPACE FLIGHT LOG

Calendar Year 1985

Launch Date	Spacecraft and Crew	Flight Time (days:hrs:min)	Highlights
Jan. 24	Space Shuttle Discovery (STS-51C) Crew: Thomas K. Mattingly Loren J. Shriver Ellison S. Onizuka James F. Buchli Gary E. Payton	3:1:33	Fifteenth STS flight. Dedicated DoD mission.
Apr. 12	Space Shuttle Discovery (STS-51D) Crew: Karol J. Bobko Donald E. Williams M. Rhea Seddon S. David Griggs Jeffrey A. Hoffman Charles D. Walker E. J. "Jake" Garn	6:23:55	Sixteenth STS flight. Two communications satellites. First U.S. Senator in space.
Apr. 29	Space Shuttle Challenger (STS-51B) Crew: Robert F. Overmyer Frederick D. Gregory Don L. Lind Norman E. Thagard William E. Thornton Lodewijk Vandenberg Taylor Wang	7:00:9	Seventeenth STS flight. Spacelab-3 in cargo bay of shuttle
June 17	Space Shuttle Discovery (STS-51G) Crew: Daniel C. Brandenstein John O. Creighton Shannon W. Lucid John M. Fabian Steven R. Nagel Patrick Baudry Sultan bin Salman bin Abdul-Aziz Al-Saud	7:01:39	Eighteenth STS flight. Three communications satellites. One reusable payload-Spartan-1. First U.S. flight with French and Saudi Arabian crewmen.

(Continued on next page)

U.S. MANNED SPACE FLIGHT LOG

Calendar Year 1985 (Continued)

Launch Date	Spacecraft and Crew	Flight Time (days:hrs:min)	Highlights
July 29	Space Shuttle Challenger (STS-51F) Crew: Charles G. Fullerton Roy D. Bridges Karl G. Henize Anthony W. England F. Story Musgrave Loren W. Acton John-David F. Bartow	7:22:45	Nineteenth STS flight. Spacelab-2 in cargo bay.
Aug. 27	Space Shuttle Discovery (STS-51I) Crew: Joe H. Engle Richard O. Covey James D. van Hoften William F. Fisher John M. Lounge	7:02:18	Twentieth STS flight. Launched three communications satellites. Repaired Syncom IV-3.
Oct. 3	Space Shuttle Atlantis (STS-51J) Crew: Karol J. Bobko Ronald J. Grabe Robert A. Stewart David C. Hilmers William A. Pailes	4:01:45	Twenty first STA flight. Dedicated DoD mission.
Oct. 30	Space Shuttle Challenger (STS-61A) Crew: Henry W. Hartsfield Steven R. Nagel Bonnie J. Dunbar James F. Buchli Guion S. Bluford Ernst Messerschmid Reinhard Furrer Wubbo J. Ockels	7:00:45	Twenty second STS flight. Dedicated German Spacelab D-1 in shuttle cargo bay.
Nov. 27	Space Shuttle Atlantis (STS-61B) Crew: Brewster H. Shaw Bryan D. O'Connor Mary L. Cleve Sherwood C. Spring Jerry L. Ross Rudolfo Neri Vela Charles D. Walker	6:22:54	Twenty third STS flight. Launched three communications satellites. First flight of Mexican astronaut

Source: NASA, Historian's Office.

ORDERS, SALES, AND BACKLOG SPACE VEHICLE SYSTEMS

(Excluding Engines and Propulsion Units)[a]
Calendar Years 1971-1985
(Millions of Dollars)

Year	SALES-Current Dollars			SALES-Constant Dollars[c]		
	TOTAL	Military[b]	Non-Military	TOTAL	Military[b]	Non-Military
1971	$1,725	$ 860	$ 865	$4,539	$2,263	$2,276
1972	1,656	905	751	4,313	2,357	1,956
1973	1,562	902	660	3,641	2,103	1,538
1974	1,751	944	807	3,710	2,000	1,710
1975	2,119	1,096	1,023	3,998	2,068	1,930
1976	2,002	904	1,098	3,452	1,559	1,893
1977	1,870	814	1,056	3,011	1,311	1,700
1978	2,324	1,006	1,318	3,554	1,538	2,015
1979	2,539	1,105	1,434	3,512	1,528	1,983
1980	3,483	1,461	2,022	4,337	1,819	2,518
1981	3,856	1,736	2,120	4,265	1,920	2,345
1982	4,749	2,606	2,143	4,749	2,606	2,143
1983	4,940	2,420	2,520	4,709	2,307	2,402
1984[r]	5,225	3,019	2,206	4,802	2,775	2,028
1985	6,271	4,212	2,059	5,706	3,833	1,874

Year	NET NEW ORDERS			BACKLOG AS OF DECEMBER 31		
	TOTAL	Military[b]	Non-Military	TOTAL	Military[b]	Non-Military
1971	$1,457	$ 677	$ 780	$ 916	$ 603	$ 313
1972	1,699	948	751	959	646	313
1973	1,780	1,179	601	1,177	923	254
1974	2,066	1,152	914	1,492	1,131	361
1975	1,931	984	947	1,304	1,019	285
1976	1,932	787	1,145	1,234	902	332
1977	2,225	1,175	1,050	1,589	1,263	326
1978	3,157	1,436	1,721[d]	2,188	1,693	495
1979	2,698	1,018	1,680	1,448	909	539
1980	3,636	1,625	2,011	2,099	1,218	881
1981	5,062	2,878	2,184	3,163	2,166	997
1982	5,842	2,718	3,124	4,254	2,277	1,977
1983	5,399	3,016	2,383	4,865	2,733	2,132
1984[r]	4,984	3,385	1,599	4,624	3,099	1,525
1985	6,847	4,547	2,300	5,200	3,434	1,766

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)." Series MA37D (Annually).

[a] See table in Missile Program Chapter for Orders, Sales, and Backlog, Engine and Propulsion Units for Missiles and Space Vehicles.

[b] Space vehicle systems and parts sold to other than U.S. Government customers included as of 1980; previously, this product group combined with missile systems and parts.

[c] Based on revised aerospace composite price deflator (1982 = 100); detail may not add to totals because of rounding.

[d] AIA estimate based on MQ37D data.

[r] Revised.

FEDERAL SPACE ACTIVITIES OUTLAYS

Fiscal Years 1961-1986
(Millions of Current Dollars)

Year	TOTAL	NASA[a]	DOD	Energy	Commerce	Other[b]
1961	$ 1,467.9	$ 693.6	$ 710.0	$ 64.3	$ —	$ —
1962	2,386.6	1,225.9	1,028.8	130.0	1.0	0.9
1963	4,078.6	2,516.8	1,367.5	181.0	12.2	1.1
1964	5,929.8	4,131.3	1,563.5	220.1	12.3	2.6
1965	6,886.1	5,035.0	1,591.8	232.2	24.1	3.0
1966	7,718.5	5,857.9	1,637.4	188.3	28.1	6.8
1967	7,237.3	5,336.7	1,673.1	183.6	38.6	5.3
1968	6,666.7	4,595.3	1,890.2	146.5	29.0	5.7
1969	6,326.1	4,078.0	2,095.0	117.5	31.0	4.6
1970	5,453.2	3,565.2	1,756.1	102.6	24.0	5.3
1971	4,999.0	3,171.0	1,693.0	97.3	29.8	7.9
1972	4,771.8	3,194.9	1,470.0	59.6	37.4	9.9
1973	4,719.4	3,069.4	1,557.0	51.1	29.4	12.5
1974	4,853.9	2,960.4	1,777.0	38.8	64.0	13.7
1975	4,890.8	2,950.9	1,831.1	34.3	63.6	10.9
1976	5,313.9	3,336.3	1,864.4	25.7	71.1	16.4
Tr. Qtr.	1,361.0	868.6	458.1	7.5	23.2	3.6
1977	5,559.1	3,599.5	1,832.7	22.2	86.9	17.8
1978	6,188.2	3,582.4	2,457.0	28.6	100.7	19.5
1979	6,808.3	3,743.9	2,891.8	54.7	97.4	20.5
1980	7,667.7	4,340.1	3,162.3	48.8	88.7	27.8
1981	9,165.5	4,877.1	4,130.5	46.9	81.0	30.0
1982	10,466.2	5,463.3	4,771.5	59.5	142.4	29.5
1983	12,590.4	6,100.9	6,246.7	39.6	178.0	25.2
1984	14,726.1	6,461.4	8,000.2	33.4	208.7	22.4
1985[E]	17,562.8	6,690.3	10,444.3	38.0	374.3	15.9
1986[E]	20,564.7	7,155.7	13,067.2	37.0	287.7	17.1

Source: NASA, "Aeronautics and Space Report of the President" (Annually).
NOTE: Detail may not add to totals because of rounding.

[a] Excludes amounts for air transportation.

[b] Departments of Interior and Agriculture, and The National Science Foundation. NSF funding transferred to NASA after 1982.

[E] Estimate. Latest year reflects Administration's budget proposal.

FEDERAL SPACE ACTIVITIES OUTLAYS IN CONSTANT DOLLARS

Fiscal Years 1961-1986
(Millions of Constant Dollars, 1982 = 100[a])

Year	TOTAL	NASA[b]	DOD	Energy	Commerce	Other[c]
1961	$ 4,668.9	$ 2,206.1	$2,258.3	$204.5	$ —	$ —
1962	7,458.1	3,830.9	3,215.0	406.3	3.1	2.8
1963	12,518.7	7,725.0	4,197.4	555.6	37.4	3.4
1964	17,941.9	12,500.2	4,730.7	666.0	37.2	7.9
1965	20,397.2	14,914.1	4,715.0	687.8	71.4	8.9
1966	22,217.9	16,862.1	4,713.3	542.0	80.9	19.6
1967	20,142.8	14,853.0	4,656.6	511.0	107.4	14.8
1968	17,926.1	12,356.3	5,082.5	393.9	78.0	15.3
1969	16,138.0	10,403.1	5,344.4	299.7	79.1	11.7
1970	13,146.6	8,595.0	4,233.6	247.3	57.9	12.8
1971	11,449.8	7,262.9	3,877.7	222.9	68.3	18.1
1972	10,360.0	6,936.4	3,191.5	129.4	81.2	21.5
1973	9,760.9	6,348.3	3,220.3	105.7	60.8	25.9
1974	9,305.8	5,675.6	3,406.8	74.4	122.7	26.3
1975	8,502.8	5,130.2	3,183.4	59.6	110.6	18.9
1976	8,559.8	5,374.2	3,003.2	41.4	114.5	26.4
Tr. Qtr.	2,108.3	1,345.5	709.6	11.6	35.9	5.6
1977	8,293.5	5,370.0	2,734.1	33.1	129.6	26.6
1978	8,628.3	4,995.0	3,425.8	39.9	140.4	27.2
1979	8,739.8	4,806.0	3,712.2	70.2	125.0	26.3
1980	9,048.5	5,121.7	3,731.8	57.6	104.7	32.8
1981	9,832.1	5,231.8	4,430.9	50.3	86.9	32.2
1982	10,466.2	5,463.3	4,771.5	59.5	142.4	29.5
1983	12,077.1	5,852.2	5,992.0	38.0	170.7	24.2
1984	13,587.5	5,961.8	7,381.6	30.8	192.6	20.7
1985[E]	15,646.1	5,960.2	9,304.5	33.9	333.5	14.2
1986[E]	17,732.8	6,170.3	11,267.7	31.9	248.1	14.7

Source: AIA, derived from NASA, "Aeronautics and Space Report of the President" (Annually).
NOTE: Detail may not add to totals because of rounding.
a Based on fiscal year GNP implicit price deflator.
b Excludes amounts for air transportation.
c Departments of Interior and Agriculture, and The National Science Foundation. NSF funding transferred to NASA after 1982.
E Estimate. Latest year reflects Administration's budget proposal.

FEDERAL SPACE ACTIVITIES BUDGET AUTHORITY

Fiscal Years 1961-1986[a]
(Millions of Current Dollars)

Year	TOTAL	NASA[a]	DOD	Energy	Commerce	Other[b]
1961	$ 1,808	$ 926	$ 814	$ 68	$ —	$ 1
1962	3,295	1,797	1,298	148	51	1
1963	5,435	3,626	1,550	214	43	2
1964	6,831	5,016	1,599	210	3	3
1965	6,956	5,138	1,574	229	12	3
1966	6,970	5,065	1,689	187	27	3
1967	6,710	4,830	1,664	184	29	3
1968	6,529	4,430	1,922	145	28	4
1969	5,976	3,822	2,013	118	20	3
1970	5,341	3,547	1,678	103	8	4
1971	4,741	3,101	1,512	95	27	5
1972	4,575	3,071	1,407	55	31	10
1973	4,825	3,093	1,623	54	40	15
1974	4,640	2,759	1,766	42	60	14
1975	4,914	2,915	1,892	30	64	13
1976	5,320	3,225	1,983	23	72	16
Tr. Qtr.	1,341	849	460	5	22	4
1977	5,983	3,440	2,412	22	91	18
1978	6,518	3,623	2,738	34	103	20
1979	7,244	4,030	3,036	59	98	21
1980	8,689	4,680	3,848	40	93	28
1981	9,978	4,992	4,828	41	87	30
1982	12,441	5,528	6,679	61	145	29
1983	15,589	6,328	9,019	39	178	25
1984	17,136	6,648	10,195	34	236	22
1985[E]	20,122	6,881	12,814	37	374	16
1986[E]	23,529	7,264	15,847	37	365	17

Source: NASA, "Aeronautics and Space Report of the President" (Annually).
Note: Detail may not add to totals because of rounding.
[a] Excludes amounts for air transportation.
[b] Departments of Interior and Agriculture, and the National Science Foundation. NSF funding transferred to NASA after 1982.
[E] Estimate. Latest year reflects Administration's budget proposal.

FEDERAL SPACE ACTIVITIES BUDGET AUTHORITY IN CONSTANT DOLLARS

Fiscal Years 1961-1986
(Millions of Constant Dollars, 1982 = 100[a])

Year	TOTAL	NASA[b]	DOD	Energy	Commerce	Other[c]
1961	$ 5,751	$ 2,945	$ 2,569	$216	$ —	$ 3
1962	10,297	5,616	4,056	463	159	3
1963	16,682	11,130	4,758	657	132	6
1964	20,669	15,177	4,838	635	9	9
1965	20,604	15,219	4,662	678	36	9
1966	20,063	14,580	4,862	538	78	9
1967	18,675	13,443	4,631	512	81	8
1968	17,556	11,912	5,168	390	75	11
1969	15,245	9,750	5,135	301	51	8
1970	12,876	8,551	4,045	248	19	7
1971	10,859	7,103	3,463	218	62	11
1972	9,933	6,667	3,055	119	67	22
1973	9,979	6,397	3,357	112	83	31
1974	8,896	5,289	3,386	81	115	27
1975	8,543	5,068	3,289	52	111	23
1976	8,570	5,195	3,194	37	116	26
Tr. Qtr.	2,077	1,315	713	8	34	6
1977	8,926	5,132	3,598	33	136	27
1978	9,088	5,052	3,818	47	144	28
1979	9,299	5,173	3,897	76	126	27
1980	10,254	5,523	4,541	47	110	33
1981	10,704	5,355	5,179	44	93	32
1982	12,441	5,528	6,679	61	145	29
1983	14,953	6,070	8,651	37	171	24
1984	15,811	6,134	9,407	31	218	20
1985[E]	17,926	6,130	11,416	33	333	14
1986[E]	20,289	6,264	13,665	32	315	15

Source: AIA, derived from NASA, "Aeronautics and Space Report of the President," (Annually).

[a] Based on fiscal year GNP implicit price deflator.

[b] Excludes amounts for air transportation.

[c] Departments of Interior and Agriculture, and The National Science Foundation. NSF funding transferred to NASA after 1982.

[d] Less than $500,000.

[E] Estimate. Latest year reflects Administration's budget proposal.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION BUDGET AUTHORITY

Fiscal Years 1961-1987
(Millions of Current Dollars)

Year	TOTAL	Research and Development	Construction of Facilities	Research & Program Management
1961	$ 964	$ 672	$125	$ 167
1962	1,825	1,285	326	214
1963	3,673	2,929	744	*(a)*
1964	5,099	3,890	713	496
1965	5,250	4,360	267	623
1966	5,175	4,502	61	602
1967	4,968	4,235	85	648
1968	4,589	3,912	38	639
1969	3,995	3,314	33	648
1970	3,749	2,993	53	703
1971	3,312	2,556	26	730
1972	3,308	2,523	53	732
1973	3,408	2,599	79	730
1974	3,040	2,194	101	745
1975	3,231	2,323	143	765
1976	3,552	2,678	82	792
Tr. Qtr.	932	700	11	221
1977	3,819	2,856	118	845
1978	4,064	3,012	162	890
1979	4,559	3,477	148	934
1980	5,243	4,088	159	996
1981	5,522	4,334	117	1,071
1982	6,020	4,772	114	1,134
1983	6,875	5,539	139	1,197

Year	TOTAL	Research and Development	Space Flight Control and Data Communications	Construction of Facilities	Research and Program Management
1984	$7,316	$2,064	$3,772	$223	$1,256
1985	7,573	2,468	3,594	178	1,332
1986^{E}	7,306	2,611	3,258	133	1,303
1987^{E}	7,694	3,003	3,069	181	1,441

Source: "The Budget of the United States" (Annually).
NOTE: Detail may not add to totals because of rounding.
a Included in Research and Development for one year.
E Estimate. Latest year reflects Administration's budget proposal.
Tr. Qtr. Transition Quarter: Until June 30, 1976, the fiscal years ran from July 1 to June 30. Beginning October 1, 1976, the fiscal years run from October 1 through September 30. A three-month "Transition Quarter" from July 1 through September 30, 1976 belongs to neither fiscal year.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION BUDGET AUTHORITY IN CONSTANT DOLLARS[r]

Fiscal Years 1961-1987

(Millions of Constant Dollars 1982 = 100[a])

Year	TOTAL	Research and Development	Construction of Facilities	Research & Program Management
1961	$3,066	$2,137	$ 398	$ 531
1962	5,703	4,016	1,019	669
1963	11,274	8,990	2,284	*(b)*
1964	15,428	11,770	2,157	1,501
1965	15,551	12,915	791	1,845
1966	14,896	12,959	176	1,733
1967	13,827	11,787	237	1,804
1968	12,339	10,519	102	1,718
1969	10,191	8,454	84	1,653
1970	9,038	7,216	128	1,695
1971	7,586	5,854	60	1,672
1972	7,182	5,478	115	1,589
1973	7,049	5,375	163	1,510
1974	5,828	4,206	194	1,428
1975	5,617	4,039	249	1,330
1976	5,722	4,314	132	1,276
TR. QTR.	1,444	1,084	17	342
1977	5,697	4,261	176	1,261
1978	5,666	4,200	226	1,241
1979	5,852	4,463	190	1,199
1980	6,187	4,824	188	1,175
1981	5,924	4,649	126	1,149
1982	6,020	4,772	114	1,134
1983	6,595	5,313	133	1,148

Year	TOTAL	Research and Development	Space Flight Control and Data Communications	Construction of Facilities	Research and Program Management
1984	$6,750	$1,904	$3,480	$ 206	$1,159
1985	6,747	2,199	3,202	159	1,187
1986[E]	6,300	2,251	2,809	115	1,124
1987[E]	6,374	2,488	2,542	150	1,194

Source: AIA, derived from "The Budget of the United States" (Annually).

NOTE: Detail may not add to totals because of rounding.

[a] Based on fiscal year GNP implicit price deflator.

[b] Included in Research and Development for one year.

[E] Estimate. Latest year reflects Administration's budget proposal.

[r] Revised. Previous edition utilized 1972 as the base year.

Tr. Qtr. Transition Quarter: Until June 30, 1976, the fiscal years ran from July 1 to June 30. Beginning October 1, 1976, the fiscal years run from October 1 through September 30. A three-month "Transition Quarter" from July 1 through September 30, 1976 belongs to neither fiscal year.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION OUTLAYS

Fiscal Years 1961-1987
(Millions of Current Dollars)

Year	TOTAL	Research and Development	Construction of Facilities	Research & Program Management
1961	$ 744	$ 487	$ 98	$ 159
1962	1,257	936	114	207
1963	2,552	1,912	225	416
1964	4,171	3,317	438	416
1965	5,093	3,984	531	578
1966	5,933	4,741	573	619
1967	5,426	4,487	289	650
1968	4,724	3,946	126	652
1969	4,251	3,530	65	656
1970	3,753	2,992	54	707
1971	3,382	2,630	44	708
1972	3,422	2,623	50	749
1973	3,315	2,541	45	729
1974	3,256	2,421	75	760
1975	3,266	2,420	85	761
1976	3,669	2,749	121	799
Tr. Qtr.	952	731	26	195
1977	3,945	2,980	105	860
1978	3,983	2,989	124	870
1979	4,196	3,139	133	925
1980	4,852	3,702	140	1,010
1981	5,426	4,228	147	1,050
1982	6,035	4,796	109	1,130
1983	6,664	5,316	108	1,240

Year	TOTAL	Research and Development	Space Flight Control and Data Communications	Construction of Facilities	Research and Program Management
1984	$7,048	$2,792	$2,915	$109	$1,232
1985	7,251	2,118	3,707	170	1,322
1986^E	7,341	2,653	3,217	161	1,310
1987^E	7,478	2,825	3,158	146	1,429

Source: "The Budget of the United States" (Annually).
NOTE: Detail may not add to totals because of rounding.
E Estimate. Latest year reflects Administration's budget proposal.
Tr. Qtr. Transition Quarter: Until June 30, 1976, the fiscal years ran from July 1 to June 30. Beginning October 1, 1976, the fiscal years run from October 1 through September 30. A three-month "Transition Quarter" from July 1 through September 30, 1976 belongs to neither fiscal year.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION OUTLAYS IN CONSTANT DOLLARS[r]

Fiscal Years 1961-1987
(Millions of Constant Dollars, 1982 = 100[a])

Year	TOTAL	Research and Development	Construction of Facilities	Research & Program Management
1961	$ 2,366	$ 1,549	$ 312	$ 506
1962	3,928	2,925	356	647
1963	7,833	5,869	691	1,277
1964	12,620	10,036	1,325	1,259
1965	15,086	11,801	1,573	1,712
1966	17,078	13,647	1,649	1,782
1967	15,102	12,488	804	1,809
1968	12,702	10,610	339	1,753
1969	10,844	9,005	166	1,673
1970	9,048	7,213	130	1,704
1971	7,746	6,024	101	1,622
1972	7,429	5,695	109	1,626
1973	6,856	5,255	93	1,508
1974	6,242	4,641	144	1,457
1975	5,678	4,207	148	1,323
1976	5,910	4,428	195	1,287
TR. QTR.	1,474	1,132	40	302
1977	5,885	4,446	157	1,283
1978	5,553	4,168	173	1,213
1979	5,386	4,030	171	1,187
1980	5,726	4,369	165	1,192
1981	5,821	4,536	158	1,126
1982	6,035	4,796	109	1,130
1983	6,392	5,099	104	1,189

Year	TOTAL	Research and Development	Space Flight Control and Data Communications	Construction of Facilities	Research and Program Management
1984	$6,503	$2,576	$2,690	$ 101	$1,137
1985	6,460	1,887	3,302	151	1,178
1986[E]	6,330	2,288	2,774	139	1,130
1987[E]	6,195	2,340	2,616	121	1,184

Source: AIA, derived from "The Budget of the United States" (Annually).
NOTE: Detail may not add to totals because of rounding.
a Based on fiscal year GNP implicit price deflator.
E Estimate. Latest year reflects Administration's budget proposal.
r Revised. Previous edition utilized 1972 as the base year.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION BUDGET AUTHORITY FOR RESEARCH AND DEVELOPMENT AND SPACE FLIGHT, CONTROL & DATA COMMUNICATIONS

Fiscal Years 1985-1987
(Millions of Dollars)

	1985	1986[E]	1987[E]
RESEARCH AND DEVELOPMENT—TOTAL	$2,468[a]	$2,757	$3,003
Space Station—Total	$ 156	$ 205	$ 410
Space Transportation Capability Development—Total	391	437	466
Space Science & Applications—Total	1,405	1,549	1,464
Physics and Astronomy	677	607	539
Planetary Exploration	291	353	323
Life Sciences	62	70	75
Space Applications	374	519	527
Technology Utilization—Total	9	11	13
Commercial Use of Space—Total	(*b*)	17	32
Aeronautics & Space Technology—Total	492	522	601
Aeronautical Research & Technology	342	354	376
Transatmospheric Research & Technology	—	—	45
Space Research & Technology	150	168	180
Tracking and Data Advanced Systems—Total	15	16	17
SPACE FLIGHT, CONTROL AND DATA COMMUNICATIONS—TOTAL	$3,594	$3,398	$3,069
Space Shuttle Production & Operational Capability—Total	$1,485	$ 972	$ 745
Orbiter	674	334	211
Launch & Mission Support	218	169	161
Propulsion Systems	592	454	338
Changes & Systems Upgrading	—	15	35
Space Transportation Operations—Total	1,314	1,725	1,525
Flight Operations	316	435	361
Flight Hardware	723	958	879
Launch & Landing Operations	276	332	285
Space and Ground Network, Communications & Data Systems—Total	796	701	799

Source: "NASA Budget Briefing Background Material" (Annually).
NOTE: Detail may not add to totals because of rounding.

[a] Amounts shown do not reflect the effects of: 1. The Balanced Budget and Emergency Control Act of 1985 on the FY 1986 NASA Budget. 2. The proposed FY 1986 termination of the Advanced Communications Technology Satellite. 3. The loss of the Challenger and crew on January 28, 1986.

[b] $8.5 million funded as parts of the Office of Space Station ($0.2 million), Office of Space Flight ($4.5 million), Office of Space Science and Applications ($2.0 million), Office of Aeronautics and Space Technology ($0.7 million) and Office of Space Tracking and Data Systems ($1.1 million).

[E] Estimate. Latest year reflects Administration's budget proposal.

DEPARTMENT OF DEFENSE SPACE PROGRAMS[a] PROCUREMENT (INCLUDING INITIAL SPARES) AND RDT&E

Fiscal Years 1985, 1986 and 1987
(Millions of Dollars)

Agency and Program	1985		1986[E]		1987[E]	
	Procurement	RDT&E	Procurement	RDT&E	Procurement	RDT&E
AIR FORCE						
Air Force Satellite Communications System (Afsatcom)	$ —	$ —	$ 32.6	$ —	$ —	$ —
Defense Meteorological Satellite Program (DMSP)	139.4	39.5	41.0	54.9	19.4	63.8
Defense Satellite Communications System (DSCS)	229.1	28.0	141.1	6.8	122.6	14.0
Navstar Global Positioning System	332.3	32.8	197.4	44.4	129.7	44.4
Space Boosters	25.2	31.4	120.2	215.8	282.7	138.7
Space Defense System	12.2	197.8	—	199.5	28.5	277.9
Space Shuttle	184.5	82.8	240.7	75.4	59.1	175.9
NAVY						
Fleet Satellite Communications (Fltsatcom)	$ 44.3	$ 11.9	$ 53.1	$ 9.9	$ 65.1	$ 11.8
JOINT PROGRAMS						
Strategic Defense Initiative	$ —	$1,397.3	$ —	$2,759.2	$ —	$4,802.6

Source: "Program Acquisition Costs by Weapon System," "Procurement Program (P-1)," and "R,D,T&E Programs (R-1)," Department of Defense Budget (Annually).

a Total Obligational Authority.

E Estimate. Latest year reflects Administration's budget proposal.

STRATEGIC DEFENSE INITIATIVE ORGANIZATION BUDGET PROGRAM

Fiscal Years 1985-1988
(Millions of Dollars)

Program	1985	1986^E	1987^E	1988^E
TOTAL	$1,397.3	$2,759.2	$4,812.9	$5,511.5
Surveill, Acquisit, Tracking & Kill Assess—TOTAL	$ 546.0	$ 857.0	$1,262.4	$1,558.3
Radar Discrimination Technology & Data Base	29.8	18.4	22.4	32.0
Optical Discrimination Technology & Data Base	130.3	116.1	127.0	94.0
Imaging Radar Technology	15.2	26.9	49.6	45.0
Imaging Laser Technology (Optical)	31.5	77.3	115.5	150.0
IR Sensor Technology	57.7	81.9	105.4	110.0
Booster Surveill & Tracking System Experiment	42.9	73.0	165.0	270.0
Space Surveillance & Tracking System Experiment	44.0	82.6	122.0	255.0
Optical Surveillance Experiment	126.0	134.7	99.1	80.0
Terminal Imaging Radar Experiment	6.0	32.3	94.6	110.0
SATKA Integrated Experiment	—	97.2	178.3	207.3
Signal Processing Technology	62.5	108.7	158.6	160.0
Interactive Discrimination Technology	—	8.0	25.0	45.0
Directed Energy Weapons Technology—TOTAL	377.6	844.4	1,615.0	1,582.0
Technology Base Development	301.6	437.4	407.5	295.0
Technology Integration Experiments	21.2	309.5	1,072.9	1,097.0
Concept Formulation & Technical Development Planning	15.1	24.0	30.0	50.0
Support Programs	39.7	73.6	104.6	140.0
Kinetic Energy Weapons Technology—TOTAL	256.0	595.8	991.2	1,217.2
Endoatmospheric Nonnuclear Kill Technology	78.5	54.2	115.9	139.9
Exoatmospheric Nonnuclear Kill Technology	29.4	44.2	95.6	168.3
Accelerator Integrated Hypervelocity/ Test Bed	5.5	34.3	63.0	99.6
Hypervelocity Technology	45.4	54.2	103.9	146.3
Hardware-In-The-Loop Simulation	12.3	19.4	31.9	75.4
Endo-NNK Interceptor Test Bed	22.7	62.0	121.5	227.2
Exo-NNK Interceptor Test Bed	6.6	73.1	106.9	169.5
Kmr Instr and SDI Targets	4.9	11.1	45.1	23.3
Kinetic Kill Vehicle	34.2	99.4	156.4	159.0
Significant Technical Milestone	16.4	143.9	151.0	8.7

(Continued on Next Page)

STRATEGIC DEFENSE INITIATIVE ORGANIZATION BUDGET PROGRAM (Continued)

Program	1985	1986^E	1987^E	1988^E
Systems Concepts/Battle Management—TOTAL	100.3	227.3	462.2	564.0
Battle Management/C^3	36.5	106.6	158.8	184.1
BM/C^3 Experimental Systems	—	22.7	83.8	109.3
SDI Systems Analysis	63.8	80.0	143.1	162.6
National Test Bed	—	18.0	76.5	108.0
Survivability, Lethality & Key Technologies—TOTAL	108.4	221.6	454.4	523.7
System Survivability	32.3	59.4	70.9	99.8
Lethality & Target Hardening	63.5	91.5	127.7	104.5
Space Power & Power Conversion	11.0	50.0	139.7	137.7
Space Transportation	1.7	20.7	67.4	169.8
Materials and Structures	—	—	21.4	—
Counter Measures	—	—	27.3	11.8

Source: U.S. Government, "Report to The Congress on the Strategic Defense Initiative, 1986," and Department of Defense, "R, D, T&E Programs (R-1)."

NOTE: Detail may not add to totals because of rounding.

E Estimate. Latest two years represent Administration's budget proposal.

FLYING TIGERS
FLYING TIGERS

After a record-setting year in 1984, the U.S. airline industry suffered a decline in operating profit during 1985. The airlines—including all scheduled and non-scheduled certificated carriers—achieved a combined operating profit margin of three percent, compared with almost five percent in the previous year. The major contributing factors were intense fare competition and attendant lower yields, coupled with operating expense growth that outstripped revenue growth.

In dollar terms, the U.S. airline industry recorded an operating profit of $1.4 billion on total revenues of $46.5 billion; the figures compare with a $2.1 billion profit on revenues of $44.1 billion in 1984. The profit decline was experienced in both domestic and international operations. For 1985, domestic operating profit was $1.0 billion on revenues of $37.6 billion; the comparable figures for 1984 were $1.6 billion on revenues of $35.4 billion. In international service, the 1985 operating profit was $321 million on revenues of $8.3 billion; in the previous year, the corresponding figures were $490 million on $8.0 billion in revenues.

Traffic on U.S. airlines, however, increased sharply. U.S. scheduled carriers flew 33.6 billion passenger revenue ton miles, a new record that topped 1984's 30.5 billion. Cargo revenue ton miles dropped slightly, from 8.2 billion in 1984 to 7.7 billion in 1985, but overall ton miles increased to 41.3 billion from the previous year's 38.7 billion. The revenue load factor for 1985 was 54.3 percent, up from 53.6 percent in 1984.

In domestic operations, U.S. scheduled airlines boarded more than 355 million passengers, another record, up from 321 million in 1984. The revenue passenger load factor was 60.7 percent, the highest figure of the 1980s. Domestic revenue passenger miles totaled more than 270 billion, again a record; the comparable figure for the previous year was 244 billion.

International traffic carried by U.S. scheduled airlines increased in 1985, continuing the trend that began in 1983 after several years of decline. Passengers enplaned totaled 24.8 million, up from 23.6 million in 1984. Revenue passenger miles amounted to 65.8 billion, which compares with 61.4 billion in the previous year. The revenue passenger load factor in international service was 64.6 percent, down from 66.2 percent, due to a large increase in available seat miles.

Air Transportation

86 87

U.S. air carriers, including operators other than the certificated airlines, were flying 4,678 multi-engined aircraft at the end of 1985, 308 more than at the end of the previous year. Turbojet aircraft numbered 3,164 (about two thirds of the total); the fleet also included 1,076 turboprops, 433 piston-powered aircraft and five helicopters.

Worldwide airline service increased substantially in 1985 but, as in the U.S., operating profits declined despite greater revenues and traffic. Airlines of the 156 member states of the International Civil Aviation Organization reported a combined profit of $4 billion on revenues of $112 billion, or 3.6 percent; the figures compare with 1984's $5.1 billion profit (4.9 percent) on revenues of $105 billion. ICAO airlines boarded 891 million passengers, an increase of six percent over 1984's 841 million; they flew 845 billion passenger miles, 56 billion more (seven percent) than in 1984. Overall passenger load factor was 66 percent, up from 65 percent in the previous year.

The world fleet of turbine-engine aircraft in airline service increased by 248 airplanes, according to the annual survey conducted by Exxon International, which covers all the world's airlines except the Soviet Union's Aeroflot and air taxi operators. As of March 31, 1985 the fleet totaled 10,496 aircraft, which compares with 10,248 a year earlier. The 1985 figure included 6,900 turbojets (up 98), 3,350 turboprops (up 159) and 246 turbine-powered helicopters (down nine).

Of the total, 66.0 percent were of U.S. manufacture, up from 65.7 percent in the previous survey. U.S. plane builders produced 83.6 percent of the turbojets in service, almost the same as the 1984 figure (83.7 percent). U.S. manufacturers built only 29.3 percent of the operating turboprops, but that figure was up from 26.9 percent in 1984. In the turbine helicopter category, 72.0 percent (up from 68.2 percent) were of American manufacture.□

OPERATING REVENUES AND EXPENSES OF WORLD SCHEDULED AIRLINES[a]

Calendar Years 1980-1985
(Millions of U.S. Dollars)

	1980	1981	1982	1983[r]	1984	1985[p]
OPERATING REVENUES:						
Scheduled Services:						
Passenger	$69,930	$74,433	$74,860	$77,600	$ 81,350	$ 87,500
Freight	9,468	9,523	9,560	10,830	12,450	12,500
Mail	1,501	1,425	1,480	1,470	1,500	1,500
Total Schedule Services	$80,899	$85,381	$85,900	$89,900	95,300	101,500
Non-Scheduled Services	3,149	3,682	3,100	2,800	2,900	3,400
Incidental	3,628	3,929	4,240	5,600	6,600	7,100
Total Operating Revenues	$87,676	$92,992	$93,240	$98,300	$104,800	$112,000
OPERATING EXPENSES:						
Flight Operations	$34,345	$36,676	$34,600	$33,050	$ 33,100	36,000
Maintenance & Overhaul	9,283	9,640	9,150	9,620	10,050	10,800
Depreciation & Amortization	5,449	5,968	6,330	6,920	7,210	7,700
User Charges & Station Expenses	13,713	13,828	14,540	15,260	16,040	17,300
Passenger Services	7,967	8,085	8,540	8,810	9,170	9,900
Ticketing, Sales & Promotion	12,484	13,800	14,510	15,810	16,540	17,800
General, Administrative & Other	5,069	5,687	5,730	6,730	7,590	8,500
Total Operating Expenses	$88,310	$93,684	$93,400	$96,200	$ 99,700	$108,000
OPERATING RESULT	$ (635)	$ (692)	$ (160)	$ 2,100	$ 5,100	$ 4,000
Percent of Revenue	(0.7%)	(0.7%)	(0.2%)	2.1%	4.9%	3.6%
NET RESULT[b]	$ (919)	$(1,150)	$(1,300)	$(700)	$ 2,000	NA
Percent of Revenue	(1.0%)	(1.2%)	(1.4%)	(0.7%)	1.9%	NA

Source: International Civil Aviation Organization.
NOTE: Data in parentheses represent negative values.
a Excludes domestic operations in the USSR.
b Net Result equals Operating Result minus non-operating items, including interest, income taxes, retirement of property and equipment, affiliated companies and subsidies.
NA Not available.
p Preliminary.
r Revised.

TRAFFIC STATISTICS WORLD AIRLINE SCHEDULED SERVICE[a]

Calendar Years 1970-1985

Year	Passengers Carried	Freight Tons Carried	Passenger-Miles Performed	Seat-Miles Available	Passenger Load Factor	Ton-Miles Performed		
						Freight	Mail	TOTAL (Passengers & Baggage, Freight, Mail)
	(Millions)		(Billions)		(Percent)	(Millions)		
1970	383	6.7	286	522	55%	8,230	2,110	38,820
1971	411	7.4	307	568	54	9,060	1,990	41,420
1972	450	8.0	348	610	57	10,290	1,900	46,690
1973	489	9.0	384	667	58	12,010	1,970	51,900
1974	515	9.6	407	688	59	13,030	1,970	55,270
1975	534	9.6	433	733	59	13,270	1,990	58,080[r]
1976	576	10.3	475	789	60	14,750	2,080	63,880
1977	610	11.0[r]	508	836	61	16,180	2,180	68,790
1978	679	11.7	582	902	65	17,770	2,240	77,770
1979	754	12.1	659	999	66	19,180	2,350	86,900
1980[r]	748	12.2	677	1,071	63	20,120	2,520	89,710[r]
1981[r]	752	12.0	695	1,091	64	21,150	2,600	92,870
1982[r]	764	12.8	710	1,114	64	21,600	2,650	94,790
1983[r]	795	13.4	738	1,148	64	23,950	2,750	99,970
1984[r]	841	14.7	789	1,217	65	27,050	2,950	108,440
1985[p]	891	14.6	845	1,290	66	26,920	2,970	114,090

Source: International Civil Aviation Organization (ICAO).

[a] Includes international and domestic traffic on scheduled service performed by the airlines of the 156 States which were members of ICAO in 1985.

[r] Revised.

[p] Preliminary.

OPERATING REVENUES AND EXPENSES OF U.S. AIR CARRIERS[a] DOMESTIC AND INTERNATIONAL OPERATIONS

Calendar Years 1961-1985
(Millions of Dollars)

Year	TOTAL OPERATIONS[b]			Domestic Operations			International Operations		
	Operating Revenues	Operating Expenses	Operating Profit (or Loss)	Operating Revenues	Operating Expenses	Operating Profit (or Loss)	Operating Revenues	Operating Expenses	Operating Profit (or Loss)
1961	$ 3,064	$ 3,043	$ 20	$ 2,305	$ 2,307	$ (2)	$ 759	$ 737	$ 22
1962	3,439	3,249	190	2,589	2,488	100	850	760	90
1963	3,759	3,479	280	2,790	2,646	144	969	833	136
1964	4,251	3,781	470	3,169	2,849	320	1,082	932	150
1965	4,958	4,286	672	3,691	3,239	452	1,267	1,047	220
1966	5,745	4,970	775	4,171	3,670	502	1,574	1,300	274
1967	6,865	6,157	708	4,981	4,560	421	1,884	1,597	287
1968	7,753	7,248	505	5,691	5,397	295	2,062	1,852	210
1969	8,791	8,403	387	6,936	6,613	322	1,855	1,790	65
1970	9,290	9,247	43	7,180	7,181	(1)	2,109	2,066	44
1971	10,046	9,717	328	7,753	7,496	257	2,292	2,221	71
1972	11,163	10,578	584	8,652	8,158	493	2,512	2,420	91
1973	12,419	11,834	585	9,694	9,200	494	2,725	2,633	91
1974	14,703	13,978	725	11,546	10,761	785	3,157	3,218	(60)
1975	15,356	15,229	128	12,020	11,902	117	3,336	3,326	11
1976	17,503	16,781	721	13,899	13,324	575	3,605	3,457	147
1977	19,926	19,018	908	15,822	15,166	657	4,104	3,852	252
1978	22,892	21,527	1,366	18,189	17,172	1,018	4,703	4,355	348
1979	27,227	27,028	199	21,652	21,523	129	5,575	5,505	69
1980	33,728	33,949	(222)	26,404	26,409	(6)	6,543	6,766	(223)
1981	36,211	36,612	(401)	28,788	29,051	(264)	6,390	6,574	(184)
1982	36,066	36,804	(739)	28,728	29,478	(750)	6,435	6,452	(17)
1983	38,593	38,231	362	31,014	31,186	(171)	7,163	6,693	470
1984[r]	44,060	41,946	2,114	35,394	33,812	1,582	7,975	7,485	490
1985	46,498	45,094	1,404	37,612	36,578	1,034	8,304	7,983	321

Source: U.S. Department of Transportation Office of Aviation Information Management, Financial Data Branch.

NOTE: Detail may not add to totals because of rounding.

[a] Scheduled and non-scheduled service for all certificated route air carriers. Excludes supplemental air carriers, commuters, and air taxis.

[b] For 1980 and subsequent years, includes 'Other' operations not reported as 'Domestic' or 'International.'

[r] Revised.

SOURCES OF OPERATING REVENUES OF U.S. AIR CARRIERS[a]
DOMESTIC AND INTERNATIONAL OPERATIONS

Calendar Years 1971-1985
(Millions of Dollars)

Year	TOTAL Operating Revenues	Passenger Service[b]	Mail[c]	Freight[b] & Air Express	Excess Baggage	Other[c]
DOMESTIC OPERATIONS						
1971	$ 7,753	$ 6,849	$227	$ 549	$14	$ 114
1972	8,652	7,686	230	618	13	105
1973	9,694	8,518	263	703	14	196
1974	11,546	9,903	264	772	17	589
1975	12,020	10,301	253	792	19	655
1976	13,899	12,104	294	942	22	537
1977	15,822	13,773	355	1,109	21	564
1978	18,189	15,753	336	1,347	23	730
1979	21,652	18,931	417	1,485	28	791
1980	26,404	23,317	446	1,582	32	1,027
1981	28,788	25,504	497	1,659	36	1,091
1982	28,728	25,440	524	1,505	42	1,218
1983	31,014	27,519	516	1,602	52	1,326
1984[r]	35,393	31,437	552	1,690	70	1,644
1985	37,612	33,329	733	1,529	74	1,947
INTERNATIONAL OPERATIONS						
1971	$ 2,292	$ 1,731	$124	$ 385	$16	$ 37
1972	2,512	1,906	110	449	14	32
1973	2,725	2,112	109	438	15	51
1974	3,157	2,353	118	542	21	122
1975	3,336	2,469	122	591	25	129
1976	3,605	2,665	112	626	27	175
1977	4,104	3,047	112	710	21	215
1978	4,703	3,534	117	750	20	282
1979	5,575	4,271	131	837	23	313
1980	6,543	4,984	175	1,011	25	348
1981	6,390	4,917	165	984	25	299
1982	6,435	4,959	177	990	25	284
1983	7,163	5,605	152	999	23	384
1984[r]	7,975	6,074	158	1,169	27	547
1985	8,304	6,454	160	1,131	28	531

Source: U.S. Department of Transportation, Office of Aviation Information Management, Financial Data Branch.
NOTE: Detail may not add to totals because of rounding.

[a] Scheduled and non-scheduled service for all certificated route air carriers. Excludes supplemental air carriers, commuters, and air taxis.

[b] Scheduled and charter.

[c] Subsidy included with Mail through 1979, and then included in Other, which also includes revenues not related to transport, plus, beginning in 1981, transport revenues not specifically broken out by category by some small carriers.

[r] Revised.

OPERATING EXPENSES OF U.S. AIR CARRIERS[a] DOMESTIC AND INTERNATIONAL OPERATIONS

Calendar Years 1971-1985
(Millions of Dollars)

Year	TOTAL Operating Expenses	Flying Operations	Maintenance	Passenger Service	Aircraft & Traffic Servicing	Promotion and Sales	Depreciation & Amortization	Other[b]
DOMESTIC OPERATIONS								
1971	$ 7,496	$ 2,255	$1,130	$ 742	$1,394	$ 839	$ 754	$ 382
1972	8,158	2,348	1,246	855	1,578	943	778	411
1973	9,200	2,638	1,408	968	1,835	1,057	839	456
1974	10,761	3,345	1,514	1,027	2,026	1,178	871	799
1975	11,902	3,919	1,611	1,117	2,158	1,271	891	936
1976	13,324	4,448	1,816	1,260	2,443	1,495	927	935
1977	15,166	5,288	2,001	1,461	2,728	1,713	967	1,008
1978	17,172	5,669	2,155	1,711	3,120	2,040	1,231	1,246
1979	21,523	7,998	2,457	2,091	3,702	2,564	1,373	1,337
1980	26,409	11,029	2,758	2,329	4,051	3,096	1,586	1,560
1981	29,051	12,037	2,822	2,522	4,497	3,708	1,723	1,742
1982	29,478	11,529	2,709	2,668	4,665	4,160	1,876	1,869
1983	31,186	11,370	2,878	2,983	5,104	4,764	2,107	1,980
1984[r]	33,812	12,161	3,176	3,192	5,369	5,310	2,223	2,380
1985	36,578	12,675	3,590	3,464	5,785	6,086	2,320	2,659
INTERNATIONAL OPERATIONS								
1971	$ 2,221	$ 646	$ 287	$ 248	$ 395	$ 313	$ 206	$ 126
1972	2,420	674	325	271	434	351	225	140
1973	2,633	752	338	302	501	368	225	148
1974	3,218	1,136	381	295	538	386	230	252
1975	3,326	1,175	392	292	565	422	225	254
1976	3,457	1,215	399	300	597	473	205	268
1977	3,852	1,303	450	351	668	526	253	301
1978	4,355	1,351	498	427	768	623	323	363
1979	5,505	1,960	571	538	922	774	352	388
1980	6,766	2,775	616	600	1,049	917	385	423
1981	6,574	2,757	540	583	932	945	382	435
1982	6,452	2,596	512	577	893	954	396	525
1983	6,693	2,490	548	664	936	1,162	389	505
1984[r]	7,485	2,629	677	749	975	1,308	446	701
1985	7,983	2,745	763	849	1,068	1,416	482	661

Source: U.S. Department of Transportation, Office of Aviation Information Management, Financial Data Branch.
NOTE: Detail may not add to totals because of rounding.

[a] Scheduled and non-scheduled service for all certificated route air carriers. Excludes supplemental air carriers, commuters, and air taxis.

[b] General and administrative, and other transport-related expenses.

[r] Revised.

U.S. AIR CARRIERS
TOTAL ASSETS AND INVESTMENT IN EQUIPMENT

Calendar Years 1966-1985
(Millions of Dollars)

Year	TOTAL Assets	Value of Flight Equipment	Value of Ground Property & Equipment, & Other[a]	Less: Reserves for Depreciation & Overhaul	Equals: Net Value of Owned Operating Property & Equipment	Investment in Operating Property and Equipment as a Percent of Total Assets
1966	$ 7,310	$ 6,096	$ 856	$ 2,457	$ 4,495	61.5%
1967	9,344	7,568	1,064	2,773	5,859	62.7
1968	10,992	9,021	1,269	3,009	7,281	66.2
1969	12,069	9,943	1,516	3,560	7,899	65.4
1970	12,913	10,950	1,951	4,120	8,782	68.0
1971	12,998	11,221	2,028	4,649	8,600	66.2
1972	13,635	11,918	2,225	5,115	9,028	66.2
1973	14,464	12,908	2,424	5,693	9,639	66.6
1974	15,200	13,538	2,539	6,252	9,826	64.6
1975	15,064	14,035	2,635	6,823	9,847	65.4
1976	15,454	14,399	2,792	7,585	9,605	62.2
1977	16,869	14,822	2,997	8,141	9,679	57.4
1978	20,745	16,127	3,367	8,799	10,696	51.6
1979	24,907	18,561	3,985	9,746	12,800	51.4
1980	28,900	20,859	4,682	10,309	15,233	52.7
1981	30,513	22,375	5,175	11,028	16,521	54.1
1982	31,525	23,786	5,424	11,405	17,804	56.5
1983	35,213	26,588	6,191	12,910	19,868	56.4
1984[r]	36,769	28,509	6,061	14,043	20,527	55.8
1985	40,815	30,312	6,771	15,438	21,645	53.0

Source: U.S. Department of Transportation, Office of Aviation Information Management, Financial Data Branch.

[a] Includes land and construction in progress.

[r] Revised.

TRAFFIC STATISTICS
U.S. AIR CARRIER SCHEDULED SERVICE[a]
Calendar Years 1961-1985

Year	Revenue Ton Miles (Millions)			Total Available Ton Miles (Millions)	Total Revenue Load Factor	Aircraft Revenue Miles (Millions)	Average Over-All Flight Stage Length (Miles)	Average Available Seats per Aircraft Mile
	Passenger	Cargo[b]	Total					
1961	3,827	1,144	4,971	10,041	49.5%	970	259	79
1962	4,210	1,360	5,570	11,468	48.6	1,010	276	86
1963	4,839	1,507	6,346	13,257	47.9	1,095	289	91
1964	5,630	1,803	7,434	15,514	47.9	1,189	301	93
1965	6,629	2,356	8,986	18,408	48.8	1,354	322	96
1966	7,736	2,949	10,686	20,939	51.0	1,482	339	98
1967	9,561	3,475	13,036	26,968	48.3	1,834	371	101
1968	11,023	4,226	15,249	33,221	45.9	2,146	401	107
1969	12,197	4,701	16,898	38,664	43.7	2,385	443	112
1970	13,171	4,994	18,166	41,693	43.6	2,426	473	117
1971	13,565	5,120	18,685	44,139	42.3	2,378	476	125
1972	15,241	5,506	20,746	45,583	45.5	2,376	471	129
1973	16,196	6,046	22,242	49,019	45.4	2,448	477	135
1974	16,292	6,133	22,425	46,848	47.9	2,258	478	140
1975	16,281	5,905	22,186	47,254	46.9	2,241	476	143
1976	17,899	6,222	24,121	49,325	48.9	2,320	480	146
1977	19,322	6,587	25,909	52,284	49.6	2,419	490	149
1978	22,678	7,001	29,679	54,765	54.2	2,520	502	152
1979	26,202	7,189	33,390	60,844	54.9	2,791	517	154
1980	25,519	7,084	32,603	62,983	51.8	2,816	526	158
1981	24,889	7,060	31,949	61,186	52.2	2,703	519	161
1982	25,964	6,886	32,850	62,401	52.6	2,699	544	167
1983	28,183	7,573	35,756	65,385	54.7	2,809	558	169
1984[r]	30,512	8,185	38,697	72,223	53.6	3,134	575	168
1985	33,590	7,662	41,252	75,915	54.3	3,301	581	168

Source: U.S. Department of Transportation, Office of Aviation Information Management, Financial Data Branch.
NOTE: Detail may not add to totals because of rounding.
[a] Includes international and domestic operations.
[b] Includes freight, air express, U.S. and foreign mail.
[r] Revised.

PASSENGER STATISTICS
U.S. AIR CARRIER SCHEDULED SERVICE
DOMESTIC AND INTERNATIONAL OPERATIONS

Calendar Years 1971-1985

Year	Revenue Passenger Enplanements (Thousands)	Average Passenger Trip-Length (Miles)	Revenue Passenger Miles (Millions)	Available Seat Miles (Millions)	Revenue Passenger Load Factor[a]
DOMESTIC OPERATIONS					
1971	156,195	681	106,438	221,503	48.1%
1972	172,452	685	118,138	226,614	52.1
1973	183,272	689	126,317	244,699	51.6
1974	189,733	684	129,732	233,880	55.5
1975	188,746	698	131,728	241,282	54.6
1976	206,279	704	145,271	261,248	55.6
1977	222,283	705	156,609	280,619	55.8
1978	253,957	719	182,669	299,542	61.0
1979	292,700	714	208,891	332,796	62.8
1980	272,829	736	200,829	346,028	58.0
1981	265,304	749	198,715	346,172	57.4
1982	274,342	766	210,149	359,528	58.5
1983	296,721	765	226,909	379,150	59.8
1984[r]	321,047	759	243,692	422,507	57.7
1985	355,186	760	270,061	445,056	60.7
INTERNATIONAL OPERATIONS					
1971	17,474	1,672	29,219	58,320	50.1%
1972	18,897	1,813	34,268	60,797	56.4
1973	18,936	1,882	35,640	65,898	54.1
1974	17,725	1,872	33,186	63,126	52.6
1975	16,316	1,905	31,082	61,724	50.4
1976	17,039	1,979	33,717	61,574	54.8
1977	18,043	2,029	36,610	64,947	56.4
1978	20,759	2,125	44,112	69,209	63.7
1979	24,163	2,199	53,132	83,330	63.8
1980	24,074	2,258	54,363	86,507	62.8
1981	20,672	2,427	50,173	78,725	63.7
1982	19,760	2,505	49,495	80,591	61.4
1983	21,917	2,506	54,920	85,388	64.3
1984[r]	23,636	2,599	61,424	92,817	66.2
1985	24,838	2,651	65,837	101,938	64.6

Source: U.S. Department of Transportation, Office of Aviation Information Management, Financial Data Branch.

[a] Revenue passenger miles as a percent of available seat miles.

[r] Revised.

TURBINE-ENGINED AIRCRAFT IN THE WORLD AIRLINE FLEET

By Model
Years 1981-1985

	1981	1982	1983	1984	1985
TOTAL AIRCRAFT IN SERVICE	8,726	9,220	9,643	10,248	10,496
Turbojets—TOTAL	6,085	6,275	6,462	6,802	6,900
Aerospatiale SE-210 Caravelle	119	93	105	100	89
Aerospatiale SN-601 Corvette	11	11	10	12	12
Airbus A300	132	168	206	220	237
Airbus A310	—	—	4	29	50
B.Ae. 111	159	156	155	154	156
B.Ae. 146	—	—	—	10	21
B.Ae. HS-125	6	9	9	10	11
B.Ae. VC-10	1	—	—	—	—
B.Ae./Aerospatiale Concorde	14	14	14	14	14
B.Ae. Trident	86	71	71	65	48
Boeing 707/720	547	512	435	365	322
Boeing 727	1,585	1,636	1,602	1,696	1,658
Boeing 737	708	779	879	940	1,008
Boeing 747	478	517	533	556	571
Boeing 757	—	—	10	33	56
Boeing 767	—	—	37	79	106
Cessna 500/550/650 Citation I/II/III	37	25	22	26	36
Convair 880/990	12	13	15	14	11
Dassault Falcon 10/20/50	45	40	46	43	28
Dassault Mercure	10	10	10	10	11
Fokker F-28 Fellowship	128	133	124	151	171
Gates Learjet	35	21	27	27	32
Gulfstream II/III G-1159	12	16	14	15	15
Ilyushin IL-62	39	47	47	48	52
Ilyushin IL-76	2	11	17	37	36
Israel Aircraft 1121/1124	5	10	12	9	4
Lockheed L-1329 JetStar	4	7	7	8	8
Lockheed L-1011 TriStar	192	215	224	231	222
MBB Hansa HFB-320	5	—	—	1	—
McDonnell Douglas DC8	358	301	336	337	302
McDonnell Douglas DC-9/MD-80	882	941	971	1,021	1,066
McDonnell Douglas DC-10	338	342	346	346	357
Rockwell/Sabreliner 60	—	—	—	1	—
Tupolev Tu-124	—	2	2	—	—
Tupolev Tu-134	68	89	86	95	95
Tupolev Tu-154	31	38	39	47	45
VFW-Fokker 614	5	—	—	—	—
Yakolev Yak-40/42	31	48	47	52	50
Turboprops—TOTAL	2,508	2,697	2,956	3,191	3,350
Aerospatiale N.262 Mohawk 298	29	22	30	35	31
Antonov An.12	3	8	8	11	9
Antonov An.24/26/30	97	149	159	152	143
B.Ae. HP-137 Jetstream	17	17	18	33	49

(Continued on next page)

TURBINE-ENGINED AIRCRAFT IN THE WORLD AIRLINE FLEET (Continued)

By Model
1981-1985

	1981	1982	1983	1984	1985
Turboprops (continued)					
B.Ae. Vanguard	8	9	8	10	10
B.Ae. Viscount	77	78	67	94	87
B.Ae. HS-748	144	151	154	151	156
Beech 99	123	128	146	163	174
Beech 90 King Air	16	20	24	29	36
Beech 100 King Air	—	8	7	8	9
Beech 200 King Air	20	22	44	43	42
Beech 18-TP Conv.	—	—	1	6	12
Beech 1900	—	—	—	5	35
Bristol 175 Britannia	12	10	8	7	8
Canadair CL-44	10	8	12	17	17
CASA/Nurtanio C-212 Aviocar	34	60	66	91	106
Cessna 208 Caravan I	—	—	—	—	3
Cessna 425/441 Conquest I/II	2	6	13	16	17
Convair 580/600/640	147	156	156	141	149
DHC-2 Turbo Beaver	8	8	11	11	11
DHC-5 Buffalo	—	—	2	2	2
DHC-6 Twin Otter	456	449	464	488	468
DHC-7 Dash 7	38	59	78	85	89
DHC-8 Dash 8	—	—	—	—	2
Dornier DO 128 Turbo-Skyservant	—	1	1	1	1
Dornier DO-228	—	—	5	18	31
Douglas DC-3T Turbo Express	—	—	—	1	1
Embraer EMB-110 Bandeirante	157	189	220	232	217
Fokker/Fairchild F-27/FH-227 Friendship	402	377	405	411	426
GAF Nomad	34	42	34	25	23
Grumman G-159 Gulfstream I	16	15	20	23	28
Grumman G-73 Turbo Mallard	1	1	6	6	6
Grumman G-21C Turbo Goose	2	2	1	—	—
Handley Page Herald	31	34	34	27	22
Hawker-Siddeley Argosy	5	5	7	7	7
Ilyushin IL-18	61	72	74	75	74
Israel Aircraft Arava 101B	—	3	5	1	—
LET L-410	11	—	—	—	—
Lockheed L-188 Electra	96	88	85	84	91
Lockheed L-100/L-382 Hercules	48	49	51	59	62
Mitsubishi MU-2B	13	13	17	17	10
NAMC YS-11	117	114	113	118	118
Pilatus PC-6 Turbo Porter	5	8	9	27	30
Pilatus Britten-Norman BN-2T Turbo Islander	—	—	—	5	5
Piper PA-31T/42 Cheyenne	6	8	10	12	16
Piper T-1040	—	—	1	4	7
Rockwell Turbo Commander	12	9	10	8	6
Saab-Fairchild 340	—	—	—	—	16
Saunders ST-27	5	9	9	10	10
Shorts SC-5 Belfast	—	3	5	5	5

(Continued on next page)

TURBINE-ENGINED AIRCRAFT IN THE WORLD AIRLINE FLEET (Continued)

By Model
1981-1985

	1981	1982	1983	1984	1985
Turboprops (continued)					
Shorts SC-7 Skyliner/Skyvan	29	36	37	34	27
Shorts 330	63	72	88	81	81
Shorts 360	—	—	7	41	66
Swearingen Merlin	6	4	2	17	26
Swearingen Metro	143	169	218	234	263
Transall C-160	5	6	6	9	9
Xian (Antonov) Y-7	—	—	—	1	1
Turbine-Powered Helicopters—TOTAL	133	248	225	255	246
Aerospatiale SA-315 Lama	2	3	7	5	5
Aerospatiale SA-316 Alouette III	—	—	3	12	12
Aerospatiale SA-318 Alouette II	7	2	1	2	1
Aerospatiale SA-319 Alouette III Astazou	—	—	1	2	2
Aerospatiale (Nurtanio) SA-330 Puma	3	2	—	19	19
Aerospatiale AS-332 Super Puma	1	1	1	5	5
Aerospatiale SA-341 Gazelle	1	2	—	—	—
Aerospatiale AS-350 Ecureuil/AStar	—	1	3	5	5
Aerospatiale AS-355 Ecureuil 2/Twinstar	—	2	1	2	2
Aerospatiale SA-360 Dauphin	7	7	8	8	—
Aerospatiale SA-365 Dauphin II	—	—	1	8	8
Bell (Agusta/Fuji) 204	4	13	10	12	10
Bell 205	—	6	6	6	6
Bell 206 Jetranger/Longranger	7	81	35	32	46
Bell 212	5	15	15	14	15
Bell (Fuji) 214/214ST	3	4	7	7	7
Bell 222 UT	—	—	—	—	4
Bell 412	—	—	—	1	4
Boeing Vertol 234 Chinook	1	6	6	6	4
Hughes (Kawasaki) 500	24	24	30	22	15
M.B.B./Nurtanio Bo. 105	11	9	7	7	7
Sikorsky S-55T	3	3	3	3	3
Sikorsky S-58T	9	13	15	14	12
Sikorsky S-61	34	42	44	42	36
Sikorsky S-62	1	—	—	—	—
Sikorsky S-64	1	—	—	—	—
Sikorsky S-76	9	11	16	15	15
Westland 30	—	1	5	6	3

Source: Exxon International Company, "Air World Survey," compiled by Aviation Data Service, Inc. (Annually).
NOTE: The "Air World Survey" covers the world's airlines with the exception of Aeroflot, the USSR national airline, and covers aircraft in service as of March 31 since 1982, and as of June 30 for prior years. Excludes air taxi operators.

U.S. TURBINE-ENGINED AIRCRAFT IN THE WORLD AIRLINE FLEET

Calendar Years 1981-1985

	1981	1982	1983	1984	1985
TOTAL AIRCRAFT IN SERVICE	8,726	9,220	9,643	10,248	10,496
Number Manufactured in U.S.	5,927	6,228	6,440	6,728	6,930
Percent Manufactured in U.S.	67.9%	67.5%	66.8%	65.7%	66.0%
Turbojet Aircraft in Service	6,085	6,275	6,462	6,802	6,900
Number Manufactured in U.S. ..	5,188	5,325	5,458	5,695	5,770
Percent Manufactured in U.S. ..	85.3%	84.9%	84.5%	83.7%	83.6%
Turboprop Aircraft in Service ...	2,508	2,697	2,956	3,191	3,350
Number Manufactured in U.S. ..	638	685	795	859	983
Percent Manufactured in U.S. ..	25.4%	25.4%	26.9%	26.9%	29.3%
Turbine-Powered Helicopters In Service	133	248	225	255	246
Number Manufactured in U.S. ..	101	218	187	174	177
Percent Manufactured in U.S. ..	75.9%	87.9%	83.1%	68.2%	72.0%

Source: Exxon International Company, "Air World Survey," compiled by Aviation Data Service, Inc. (Annually).
NOTE: The "Air World Survey" covers the world's airlines with the exception of Aeroflot, the USSR national airline, and includes aircraft in service as of March 31 since 1982, and as of June 30 for prior years. Excludes air taxi operators.

JET FUEL COSTS AND CONSUMPTION BY U.S. AIR CARRIERS[a]

Calendar Years 1971-1985

Year	Gallons Consumed (Millions)	Total Cost (Millions)	Cost Per Gallon (Cents)	Cost Index (1972 = 100)	Cost of Fuel as Percent of Cash Operating Expenses
1971	9,976.8	$1,124.7	11.3¢	96.7	12.6%
1972	10,100.8	1,178.2	11.7	100.0	12.1
1973	10,700.4	1,365.3	12.8	109.4	12.1
1974	9,565.2	2,333.5	24.4	209.2	17.3
1975	9,495.3	2,777.3	29.2	250.8	18.9
1976	9,820.8	3,116.1	31.7	272.0	19.2
1977	10,282.0	3,729.8	36.3	311.0	20.1
1978	10,627.1	4,178.2	39.3	337.1	19.7
1979	11,278.1	6,503.0	57.7	494.4	24.4
1980	10,874.0	9,769.5	89.8	770.3	29.7
1981	10,087.8	10,498.0	104.1	892.2	29.3
1982	9,935.4	9,755.2	98.2	841.8	27.2
1983	10,207.8	9,073.1	88.9	762.0	24.5
1984	11,100.2	9,439.3	85.0	729.1	23.9
1985	11,645.6	9,386.0	80.6	691.0	22.4

Source: Air Transport Association of America

[a] Includes Majors and Nationals, per CAB classifications effective 1981, corresponding to previous categories of System Trunks and Local Service Carriers. Revised from previously reported data. Air Florida, Capitol and Transamerica not included in 1984 data, and excluded from prior year data for comparability.

U.S. CIVIL AND JOINT-USE AIRCRAFT FACILITIES[a] BY TYPE AND STATE

As of December 31, 1985

State	TOTAL[a]	Public[b]	Paved	Lighted	State	TOTAL[a]	Public[b]	Paved	Lighted
Alabama	174	102	123	99	Nevada	121	63	54	27
Alaska	610	437	57	122	New Hampshire	53	28	30	19
Arizona	246	78	134	69	New Jersey	295	66	115	64
Arkansas	163	97	101	79	New Mexico	169	74	74	51
California	887	282	616	271	New York	485	192	197	135
Colorado	321	91	149	102	N. Carolina	292	130	122	111
Connecticut	108	28	61	31	N. Dakota	484	103	71	93
Delaware	36	12	12	15	Ohio	690	217	251	200
Dist. of Col.	15	2	12	5	Oklahoma	336	172	173	140
Florida	557	137	224	153	Oregon	342	111	139	84
Georgia	304	118	158	122	Pennsylvania	719	174	252	159
Hawaii	50	14	40	12	Rhode Island	18	7	12	7
Idaho	202	119	68	44	S. Carolina	139	73	65	64
Illinois	888	127	206	168	S. Dakota	164	76	49	75
Indiana	523	125	141	122	Tennessee	176	87	105	83
Iowa	278	154	128	154	Texas	1,603	409	776	427
Kansas	385	154	124	147	Utah	101	50	63	44
Kentucky	134	75	88	63	Vermont	61	20	17	9
Louisiana	353	97	194	78	Virginia	282	84	124	89
Maine	144	81	42	32	Washington	395	141	176	136
Maryland	151	47	66	50	W. Virginia	93	40	53	33
Massachusetts	131	51	83	44	Wisconsin	410	151	130	136
Michigan	422	223	168	172	Wyoming	101	46	44	36
Minnesota	479	162	116	140	**50 States-Total**	16,252	5,823	6,678	4,920
Mississippi	188	97	102	78	Puerto Rico	31	11	27	10
Missouri	437	161	188	147	Virgin Islands	7	2	3	2
Montana	200	128	86	82	S. Pacific[c]	28	25	13	9
Nebraska	327	110	99	97	**TOTAL**	16,318	5,861	6,721	4,941

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation" (Annually).

[a] 16,318 aircraft facilities consist of 12,744 airports (5,523 for public use and 7,221 for private use), 3,120 heliports (112 for public use and 3,008 for private use), 67 stolports (9 for public use and 58 for private use), and 387 seaplane bases (217 for public use and 170 for private use). Included in these data are facilities having joint civil-military use.

[b] 'Public' refers to use, whether publicly or privately owned.

[c] American Samoa, Guam, and Trust Territories.

ACTIVE MULTI-ENGINE U.S. AIR CARRIER FLEET

By Type of Aircraft, Number of Engines and Model
Active as of December 1981-1985

	1981	1982	1983	1984	1985
TOTAL	3,970	4,072	4,203	4,370	4,678
Turbojets—TOTAL	2,511	2,674	2,767	2,959	3,164
Four-Engine—TOTAL	365	354	309	349	322
Boeing 707/720	68	56	25	22	27
Boeing 747	147	144	146	156	151
B.Ae. 146	—	—	3	14	29
Convair 880(22)/990(30)	6	3	2	—	—
McDonnell Douglas DC-8	144	151	133	157	115
Three-Engine—TOTAL	1,363	1,387	1,393	1,438	1,488
Boeing 727	1,096	1,110	1,122	1,161	1,195
Lockheed L-1011	106	111	116	103	114
McDonnell Douglas DC-10	161	166	155	174	179
Twin-Engine—TOTAL	783	933	1,065	1,172	1,354
Airbus A-300	25	30	34	38	46
Airbus A-310	—	—	—	—	4
Boeing 737	236	290	348	391	476
Boeing 757	—	2	15	19	48
Boeing 767	—	13	49	53	59
B.Ae. BAC-111	27	36	36	33	32
Canadair CL600	—	1	—	—	—
Cessna C500 Citation I	1	2	1	1	2
Dassault MD-20, Falcon	27	23	12	11	2
Fokker F-28	9	11	6	23	41
Grumman G-1159	3	2	1	1	—
Hamburger Flugzeugbau HF-320	—	—	1	—	—
Hawker-Siddeley HS125	—	2	—	—	—
Israel Westwind 1123/1124	—	1	—	—	—
Learjet LR-23/LR-24	3	4	—	—	—
Learjet LR-25	1	—	—	—	—
Learjet LR-35	—	3	4	8	3
Learjet LR36	—	1	—	—	—
McDonnell Douglas DC-9/MD-80	447	509	557	594	641
Rockwell NA-265 Sabreliner	—	1	—	—	—
Sud Aviation SE210 Caravelle	2	2	1	—	—
Sud Aviation SN601	2	—	—	—	—
Turboprops—TOTAL	852	826	876	956	1,076
Four-Engine—TOTAL	105	116	99	109	108
Canadair CL44D	4	4	2	5	6
De Havilland DHC-7	29	43	46	46	42
Lockheed 188 Electra	51	47	37	34	38
Lockheed 382/L-100 Hercules	20	19	11	22	22
Vickers V745	1	3	3	2	—

(Continued on next page)

ACTIVE MULTI-ENGINE U.S. AIR CARRIER FLEET

By Type of Aircraft, Number of Engines and Model (Continued)

	1981	1982	1983	1984	1985
Twin-Engine—TOTAL	747	710	777	847	968
Beech BE1900	—	—	—	17	42
Beech BE99	102	108	101	85	103
Beech BE90	2	4	2	2	3
Beech BE200	2	2	4	6	1
Beech STC 18	—	—	1	1	—
Beech 100	—	—	1	2	1
CASA C212 Aviocar	15	16	28	27	24
Cessna C441	—	2	1	3	1
Convair 580/600/640	251	98	100	107	100
DeHavilland DHC-6	96	101	112	107	86
DeHavilland DHC-8	—	—	—	—	10
Dornier DO 228	—	—	—	—	6
Douglas DC-3	—	—	—	—	1
Embraer EMB110	66	83	83	81	79
Fairchild/Fokker F-27/FH-227	16	23	35	46	63
Fairchild Swearingen SA-226	72	105	99	121	113
Fairchild Swearingen SA-227	4	26	55	70	101
GAF N22/N24 Nomad	3	2	—	—	—
Grumman G-73	1	4	4	—	3
Grumman G-159	17	19	16	21	23
Handley Page HP-137	12	12	10	10	46
Hawker-Siddeley HS748	2	5	5	2	—
Israel Aircraft AR101B	2	3	—	—	—
Mitsubishi MU-2	—	—	2	1	3
Nihon YS-11	27	27	35	30	42
Nord ND-262/STC-262	15	15	9	14	14
Piper PA31T	1	1	6	8	4
Rockwell Aero Commander 690	—	—	1	4	4
Saab-Fairchild SF340A	—	—	—	3	17
Short SD-3/SD-330	39	52	66	78	77
Short SC-7	2	2	1	1	1
Piston-Engine—TOTAL	606	569	551	443	433
Four-Engine—TOTAL	68	57	52	50	38
DeHavilland DHC-114	21	16	11	6	—
Douglas DC-4	6	3	3	3	3
Douglas DC-6	41	38	38	41	34
Douglas DC-7	—	—	—	—	1
Three-Engine—TOTAL	—	—	—	4	4
Pilatus Britten-Norman BN2A-MK.3 Trislander	—	—	—	4	4
Twin-Engine—TOTAL	535	510	499	389	391
Helicopters—TOTAL	4	5	9	12	5

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation," (Annually).
NOTE: Effective 1978, includes certified route air carriers, supplemental air carriers (charters), and all aircraft over 12,500 pounds operated by air taxis, commercial operators and travel clubs. Effective 1979, includes multi-engine aircraft in passenger service of commuters. "Active aircraft" must have a current U.S. registration and have been flown during the calendar year.

ACTIVE U.S. CIVIL AIRCRAFT[a]

As of December 31, 1960-1984

Year	TOTAL	Air Carrier[b]	General Aviation Aircraft					
			TOTAL	Fixed-Wing Aircraft			Rotorcraft[c]	Other[d]
				Multi-Engine	Single-Engine			
					4-place & over	3-place & less		
1960	78,684	2,135	76,549	7,243	34,829	33,472	634	371
1961	82,736	2,104	80,632	8,401	38,206	32,800	798	427
1962	86,168	2,047	84,121	9,186	41,120	32,341	967	507
1963	87,167	2,079	85,088	9,695	42,647	30,977	1,171	588
1964	90,823	2,081	88,742	10,644	45,777	30,367	1,306	648
1965	97,567	2,125	95,442	11,977	49,789	31,364	1,503	809
1966	106,978	2,272	104,706	13,548	52,972	35,687	1,622	877
1967	116,638	2,452	114,186	14,651	56,865	39,675	1,899	1,096
1968	126,823	2,586	124,237	16,760	60,977	42,830	2,350	1,320
1969	133,496	2,690	130,806	18,111	63,703	45,001	2,557	1,434
1970	134,422	2,679	131,743	18,291	64,759	44,884	2,255	1,554
1971	133,790	2,642	131,148	17,855	64,464	44,792	2,352	1,685
1972	147,593	2,583	145,010	19,849	70,998	49,448	2,787	1,928
1973	156,139	2,599	153,540	21,929	74,831	51,386	3,143	2,251
1974	163,974	2,472	161,502	23,418	78,924	53,008	3,610	2,542
1975	170,970	2,495	168,475	24,559	82,621	54,390	4,073	2,832
1976	180,796	2,492	178,304	25,684	88,211	56,730	4,505	3,174
1977	186,767	2,473	184,294	26,652	91,960	57,340	4,726	3,616
1978	201,321	2,543	198,778	28,782	101,466	59,185	5,315	4,028
1979	213,948	3,609	210,339	31,311	106,028	62,362	5,864	4,770
1980	214,853	3,808	211,045	31,664	107,930	60,505	6,001	4,945
1981	217,196	3,970	213,226	33,301	107,983	59,914	6,974	5,049
1982	213,851	4,072	209,779	33,228	106,503	57,670	6,169	6,209
1983	217,496	4,203	213,293	34,404	107,228	59,199	6,540	5,923
1984	225,313	4,370	220,943	35,648	109,433	61,989	7,096	6,275

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation," (Annually).

NOTE: Detail may not add to totals because of estimating procedures.

[a] Before 1971, an active aircraft was one certified as eligible to fly. Currently, an "active aircraft" must have a current U.S. registration and have been flown during the previous calendar year.

[b] Effective 1978, includes certificated route air carriers, supplemental air carriers (charters), and all aircraft over 12,500 pounds operated by air taxis, commercial operators and travel clubs. Effective 1979, includes multi-engine aircraft in commuter passenger service. Excludes single-engine aircraft as of 1978.

[c] Includes autogiros; excludes air carrier helicopters.

[d] Includes gliders, dirigibles and balloons.

ACTIVE U.S. CIVIL AIRCRAFT BY PRIMARY USE AND TYPE OF AIRCRAFT

As of December 31, 1984

Primary Use[a]	TOTAL	Fixed Wing			Rotor-craft[b]	Other[c]
		Turbojet	Turboprop	Piston		
TOTAL—ALL AIRCRAFT	225,313	7,279	6,765	197,885	7,108	6,275
Air Carrier—TOTAL	4,370	2,959	956	443	12	—
Certificated Route Air Carriers	2,692	2,572	110	10	—	—
Supplemental Air Carriers	194	117	50	27	—	—
Commercial Operators	74	35	25	14	—	—
Air Taxis	95	22	38	35	—	—
Commuters	1,132	92	700	328	12	—
All Cargo	162	100	33	29	—	—
Air Travel Clubs	21	21	—	—	—	—
General Aviation—TOTAL	220,943	4,320	5,809	197,442	7,096	6,275
Executive	16,675	3,248	3,637	8,614	1,035	141
Business	47,098	266	737	45,435	541	119
Commuter[d]	1,232	49	376	801	7	0
Air Taxi[d]	7,292	332	515	4,925	1,504	16
Instructional	15,287	11	10	14,273	533	460
Rental	9,406	17	34	8,751	96	509
Personal	105,309	72	89	100,352	705	4,091
Aerial Application	7,332	0	75	6,679	578	0
Aerial Observation	5,173	0	44	4,161	840	128
Other Work	1,328	0	47	881	155	244
Other	4,777	303	244	2,560	1,104	567

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation," (Annually).

NOTE: Detail may not add to totals because of estimating procedures.

[a] Definitions of "primary use" categories available in Glossary of "FAA Statistical Handbook."

[b] Includes helicopters and autogiros.

[c] Includes gliders, dirigibles and balloons.

[d] Air taxis under 12,500 pounds and single-engine commuters; other aircraft in these categories included with "air carriers."

U.S. GENERAL AVIATION ACTIVE AIRCRAFT AND HOURS FLOWN BY PRIMARY USE

Calendar Years 1980-1984

Primary Use[a]	1980	1981	1982	1983	1984
ACTIVE AIRCRAFT AS OF DECEMBER 31					
TOTAL	211,045	213,226	209,779	213,293	220,943
Executive	14,860	18,582	15,739	17,064	16,675
Business	49,391	47,716	47,873	45,025	47,098
Commuter	944	1,023	1,070	1,479	1,232
Air Taxi	7,615	7,226	8,122	6,857	7,292
Instructional	14,862	14,993	14,708	15,450	15,287
Rental	11,829	10,585	9,844	7,674	9,406
Personal	96,222	95,510	94,820	101,484	105,309
Aerial Application[c]	15,323	7,976	7,155	7,051	7,332
Aerial Observation[c]		3,384	4,164	4,023	5,173
Other Work[c]		1,491	1,733	2,392	1,328
Other[c]		4,741	4,546	4,791	4,777
THOUSANDS OF HOURS FLOWN					
TOTAL	41,016	40,704	36,457	35,249	36,119
Executive	5,332	6,190	4,983	5,241	4,773
Business	8,434	8,122	6,861	5,956	6,635
Commuter[b]	961	979	1,086	1,602	1,504
Air Taxi[b]	3,535	2,809	3,187	2,528	3,019
Instructional	5,748	5,597	4,924	4,865	4,553
Rental	3,917	3,768	2,961	2,389	2,855
Personal	8,894	8,241	8,182	8,477	8,418
Aerial Application[c]	4,105	2,447	2,043	1,762	2,008
Aerial Observation[c]		1,402	1,256	1,138	1,314
Other Work[c]		369	467	642	312
Other[c]		769	638	553	729

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation," (Annually).

NOTE: Detail may not add to totals because of rounding and estimating procedures.

[a] Definitions of "primary use" categories available in Glossary of "FAA Statistical Handbook."

[b] Air taxis under 12,500 pounds and single-engine commuters; other aircraft in these categories classified as "air carriers."

[c] Prior to 1981, reported as Aerial Application (differently defined), Industrial, and Other.

U.S. GENERAL AVIATION
TYPE OF AIRCRAFT AND HOURS FLOWN
Calendar Years 1980-1984

	1980	1981	1982	1983	1984
Number of Active Aircraft by Type					
All Aircraft—TOTAL	211,045	213,226	209,779	213,293	220,943
Fixed Wing: Piston					
Single Engine: 1-3 Seats	60,505	59,914	57,670	59,199	61,989
4 + Seats	107,930	107,983	106,503	107,228	109,933
Multi-Engine: 1-6 Seats	16,224	16,749	16,381	16,249	16,539
7 + Seats	8,141	8,607	8,501	8,660	8,719
Other	212	114	140	143	262
Turboprop:					
Twin Engine: 1-12 Seats	3,339	3,968	4,427	4,733	4,992
13 + Seats	627	557	610	578	640
Other	123	134	149	142	176
Turbojet: Twin Engine	2,551	2,808	3,309	3,447	3,780
Other	441	362	687	451	540
Rotorcraft: Piston	2,794	3,250	2,419	2,541	2,936
Turbine	3,207	3,724	3,749	3,998	4,160
Balloons, Dirigibles, and Gliders	4,945	5,049	5,233	5,923	6,275
Thousands of Hours Flown by Type of Aircraft					
All Aircraft—TOTAL	41,016	40,704	36,457	35,249	36,119
Fixed Wing: Piston	34,747	34,086	29,950	28,911	29,194
Turboprop	2,240	2,155	2,168	2,173	2,506
Turbojet	1,332	1,387	1,611	1,473	1,566
Rotorcraft: Piston	736	930	579	572	592
Turbine	1,603	1,754	1,771	1,700	1,903
Balloons, Dirigibles, and Gliders	359	391	379	420	358
Average Hours Flown per Year per Aircraft by Type					
All Aircraft—TOTAL	191	188	174	164	158
Fixed Wing: Piston:					
Single Engine: 1-3 Seats	166	171	146	140	139
4 + Seats	170	163	151	139	137
Multi-Engine: 1-6 Seats	228	215	187	187	181
7 + Seats	311	326	317	318	303
Other	625	197	247	240	433
Turboprop:					
Twin Engine: 1-12 Seats	445	398	356	301	342
13 + Seats	1,038	989	853	1,139	1,112
Other	487	499	394	579	339
Turbojet: Twin Engine	456	443	407	392	349
Other	350	377	385	274	393
Rotorcraft: Piston	263	285	237	221	187
Turbine	498	490	474	432	469
Balloons, Dirigibles, and Gliders	75	78	72	71	56

Source: General Aviation Manufacturers Association, "General Aviation Statistical Databook," (Annually), based on data from the Federal Aviation Administration.

NOTE: Detail may not add to totals because of rounding and/or estimating procedures.

ACTIVE U.S. AIRMAN CERTIFICATES HELD

As of December 31, 1981-1985

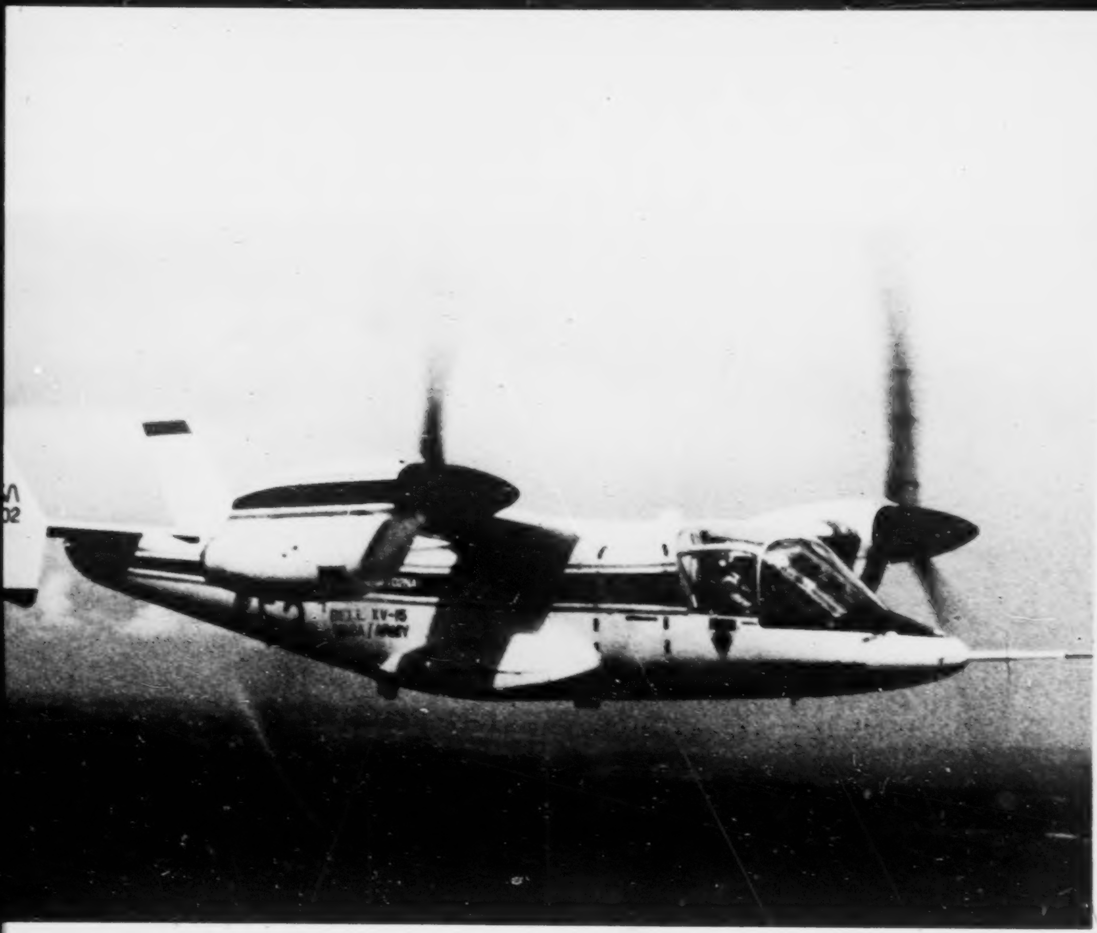
	1981	1982	1983	1984	1985
Pilots—TOTAL	764,182	733,255	718,004	722,376	709,540
Students	179,912	156,361	147,197	150,081	146,652
Private	328,562	322,094	318,643	320,086	311,086
Commercial	168,580	165,093	159,495	155,929	151,632
Airline Transport	70,311	73,471	75,938	79,192	82,740
Helicopter (only)	6,453	7,034	7,237	7,532	8,123
Glider (only)[a]	7,388	7,842	8,157	8,390	8,168
Lighter-Than-Air[a]	2,976	1,360	1,337	1,166	1,139
Non-Pilots—TOTAL	398,368	420,595	432,890	447,462	412,741
Mechanics[b]	262,705	277,436	288,335	298,028	274,100
Parachute Rigger[b]	9,716	9,893	10,074	10,194	9,395
Ground Instructor[b]	63,246	65,004	66,385	67,463	58,214
Dispatcher[b]	7,094	7,580	8,223	8,980	8,511
Control Tower Operator	15,528	20,934	19,691	20,660	17,602
Flight Navigator	1,785	1,695	1,636	1,603	1,542
Flight Engineer	38,294	38,053	38,546	40,534	43,377
Flight Instructor Certificates[c]	57,523	62,492	62,201	61,173	58,940
Instrument Ratings[c]	252,535	255,073	254,271	256,584	258,559

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation," (Annually).

[a] Glider and lighter-than-air pilots are not required to have a medical examination; however, the totals above are the pilots who received a medical.

[b] No periodic medical examination required; therefore, no determination as to current activity can be made.

[c] Special ratings shown on pilot certificates represented above, not additional certificates.



The number of North American civil helicopter operators and the number of facilities in service declined sharply between 1982 and 1985, according to the *1985/86 Directory of Helicopter Operators in the United States, Canada, Mexico and Puerto Rico* compiled by Aerospace Industries Association.

The directory reported that the number of operators dipped to 2,481 in 1985, compared with 2,688 in 1982, the last prior year the directory was published. The number of civil helicopters in service in 1985 was 7,904, down from 8,884 in 1982. In both operators and helicopters operated, the declines were the first reported by the directory in 25 years.

The declines were due to a number of factors, among them contraction of the offshore oil industry and certain other commercial operations involving helicopter use. In addition, a trend throughout the helicopter industry is the upgrading of fleets with advanced helicopters that outperform their predecessors in range, speed and capacity; the net effect is a reduction in units required because fewer helicopters can perform more work.

The greatest decrease in the number of operators—more than 100—was in the business/private category, which fell from 1,158 in 1982 to 1,051 in 1985. Commercial operators declined from 1,188 to 1,136 and the number of civil government agencies operating helicopters dipped from 342 to 294. There was a slight increase—from 239 to 241—in the number of helicopter flight schools. Despite the general decline, there was continuing growth in the number of emergency medical helicopter services; in 1985, there were 112 hospital-sponsored ambulance services and an additional 36 operated by state, municipal and commercial organizations.

In terms of number of civil helicopters, the greatest decrease was in the commercial category, where the directory listed 5,270 units in 1985, down from 5,874 in 1982. Business/private helicopters declined to 1,552 (down from 1,728 in 1982) and civil government helicopters numbered 1,082 (down from 1,282).

During 1985, there were three scheduled

Helicopter Transportation

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helicopter services operating in the U.S., all of them in the New York/New Jersey area. New York Helicopter Airline transported 123,850 passengers on 44 daily flights connecting the 34th Street (New York) Heliport with the three major area airports; the company was operating six Aerospatiale Dauphins and three Sikorsky S-55Ts. Pan Am Helicopter Service, with 15-passenger Westland 60 helicopters, was providing flights for its long haul passengers between Newark and Kennedy Airports and New York's East 60th Street Heliport; movements average about 50,000 annually. Resorts International Airline, Inc. was flying more than 3,000 passengers a month in its 24-passenger Sikorsky S-61s between the West 30th Street Heliport, New York and the Steeplechase Pier Heliport in Atlantic City, New Jersey.

The Federal Aviation Administration's National Prototype Demonstration Heliport Program, intended to evaluate modern heliport design and equipment for Instrument Flight Rules operation, progressed with the January 1986 dedication of the New Orleans Heliport, the second facility in the program. A third—New York's Wall Street Pier Heliport—was in construction and scheduled for completion late in 1986. Work on a fourth in Los Angeles awaited completion of an environmental assessment and legislative actions.

In development for military use was the V-22 Osprey tilt rotor aircraft, which also has potential as a short haul civil transport. Being developed jointly by Bell Helicopter Textron and Boeing Vertol Company, the V-22 is based upon the earlier NASA/Army/Navy XV-15 tilt rotor; NASA continued to conduct flight tests of the XV-15 in support of the V-22 program and as a means of evaluating the potential of tilt rotors as future civil commuter aircraft. Also in development and slated for first flights in the latter part of 1986 was the NASA/DARPA/Sikorsky X-wing research aircraft, which incorporates a stiff rotor that can be stopped in flight to become a fixed-wing system. The concept combines the advantages of vertical lift with forward speed potential approaching 500 miles per hour.☐

HELIPORTS AND HELISTOPS[a] IN THE UNITED STATES, CANADA AND PUERTO RICO

By Region
Selected Years 1973-1984[e]

Region	1973	1975	1977	1981	1984[e]
TOTAL	2,384	3,268	3,433	3,985	4,232
Elevated Facilities	241	277	299	319	385
New England	78	143	164	168	172
Middle Atlantic	581	684	795	727	793
East North Central	307	411	397	718	640
West North Central	110	98	107	164	215
South Atlantic	204	352	306	416	511
East South Central	64	107	144	203	192
West South Central	217	338	339	409	551
Mountain	176	241	213	268	312
Pacific	551	789	821	734	634
Puerto Rico	24	30	73	71	65
Canada	72	75	74	107	147

Source: Aerospace Industries Association, "Directory of Heliports Helistops in the U.S., Canada, Puerto Rico, 1984."

[a] Includes Hospital Heliports reported below; excludes offshore oil platforms and rigs, which numbered 261 as of May 1984.

[e] Latest available data.

HOSPITAL HELIPORTS[a] IN THE UNITED STATES, CANADA AND PUERTO RICO

By Region
Selected Years 1973-1984[e]

Region	1973	1975	1977	1981	1984[e]
TOTAL	384	565	699	905	1,071
New England	5	16	21	31	30
Middle Atlantic	42	55	73	93	107
East North Central	99	126	150	193	193
West North Central	21	22	29	69	97
South Atlantic	50	76	82	135	176
East South Central	18	29	54	171	76
West South Central	26	59	67	77	110
Mountain	32	56	67	88	98
Pacific	87	119	147	135	167
Puerto Rico	—	—	2	2	3
Canada	4	7	7	11	14

Source: Aerospace Industries Association, "Directory of Heliports/Helistops in the U.S., Canada, Puerto Rico, 1984."

[a] Included in Heliports/Helistops data reported in previous table.

[e] Latest available data.

HELIPORTS/HELISTOPS[a] AND HOSPITAL HELIPORTS IN THE UNITED STATES, CANADA AND PUERTO RICO

By State
As of 1984[e]

State & Country	Heliports and Helistops	
	Total	Hospital Heliports
TOTAL	4,232	1,071
U.S.—TOTAL	4,020	1,054
Alabama	75	24
Alaska	49	7
Arizona	94	25
Arkansas	10	6
California	365	92
Colorado	109	38
Connecticut	55	1
Delaware	22	3
Dist. of Col.	22	5
Florida	166	53
Georgia	61	21
Hawaii	18	6
Idaho	23	7
Illinois	250	90
Indiana	74	22
Iowa	48	28
Kansas	25	11
Kentucky	28	12
Louisiana	145	26
Maine	12	2
Maryland	64	27
Massachusetts	66	19
Michigan	51	19
Minnesota	19	3
Mississippi	31	18
Missouri	80	37
Montana	15	8
Nebraska	30	13
Nevada	21	4
New Hampshire	20	5
New Jersey	413	27
New Mexico	13	5
New York	118	29
North Carolina	43	21
North Dakota	7	4
Ohio	230	57
Oklahoma	26	15
Oregon	90	33
Pennsylvania	262	51
Rhode Island	5	1
South Carolina	15	5
South Dakota	6	1
Tennessee	58	22
Texas	370	63
Utah	22	7
Vermont	14	2
Virginia	78	30
Washington	112	29
West Virginia	40	11
Wisconsin	35	5
Wyoming	15	4
Puerto Rico	65	3
Canada	147	14

Source: Aerospace Industries Association, "Directory of Heliports/Helistops in the U.S., Canada, and Puerto Rico, 1984."

[a] Excludes offshore oil platforms and rigs, which numbered 261 as of May 1984.

[e] Latest available data.

CIVIL HELICOPTER OPERATORS AND HELICOPTERS OPERATED IN THE UNITED STATES, CANADA, MEXICO AND PUERTO RICO[a]

Selected Years 1965-1985

Year	TOTAL	Commercial	Corporate and Executive	Civil Government Agencies[b]
CIVIL HELICOPTER OPERATORS				
1965	860	508	299	53
1966	933	519	353	61
1967	1,023	522	427	74
1969	1,379	689	596	94
1971	1,424	672	590	162
1972	1,491	758	566	167
1973	1,532	752	599	181
1974	1,536	725	608	203
1975	1,891	779	833	279
1976	2,330	911	1,082	337
1977	2,547	959	1,219	369
1978	3,003	1,126	1,515	362
1980[d]	2,573	1,065	1,160	348
1982	2,688	1,188	1,158	342
1985	2,481	1,136	1,051	294
HELICOPTERS OPERATED[c]				
1965	2,053	1,537	401	115
1966	2,318	1,699	475	144
1967	2,438	1,764	487	187
1969	3,433	2,390	770	273
1971	3,874	2,605	802	467
1972	4,185	2,992	745	448
1973	4,601	3,295	780	526
1974	4,819	3,418	778	582
1975	5,222	3,342	1,056	824
1976	6,181	3,702	1,392	1,087
1977	7,160	4,294	1,578	1,288
1978	8,023	4,904	1,891	1,228
1980[d]	8,575	5,581	1,635	1,360
1982	8,884	5,874	1,728	1,282
1985	7,904	5,270	1,552	1,082

Source: Aerospace Industries Association, "Directory of Helicopter Operators in the United States, Canada, Mexico and Puerto Rico, 1985/86."

[a] Effective 1982, includes Mexico.

[b] Federal, state and local governments.

[c] Includes some helicopters on order.

[d] Because computerization of Directory data resulted in the elimination of some duplication of operator and helicopter listings, 1980 and subsequent data are not comparable with those of previous years.

CIVIL HELICOPTER FLEET
UNITED STATES, CANADA, MEXICO AND PUERTO RICO
1985

State	OPERATORS				HELICOPTERS			
	TOTAL	Commercial	Corp. and Exec.	Civil Gov't.	TOTAL	Commercial	Corp. and Exec.	Civil Gov't.
Alabama	34	12	16	6	91	38	23	30
Alaska	51	34	13	4	280	256	16	8
Arizona	60	34	19	7	183	139	22	22
Arkansas	16	9	6	1	42	34	7	1
California	277	140	96	41	846	495	170	181
Colorado	64	25	34	5	156	94	47	15
Connecticut	26	10	16	—	59	38	21	—
Delaware	6	—	5	1	6	—	5	1
Dist. of Col.	7	1	—	6	31	3	—	28
Florida	169	75	60	34	292	239	65	88
Georgia	39	13	14	12	99	47	17	35
Hawaii	24	20	3	1	56	52	3	1
Idaho	38	20	15	3	80	55	20	5
Illinois	46	21	19	6	115	67	29	19
Indiana	42	18	17	7	109	62	33	15
Iowa	18	8	5	5	35	15	6	14
Kansas	19	12	4	3	36	23	6	7
Kentucky	37	8	27	2	57	21	32	4
Louisiana	46	22	17	7	699	632	54	13
Maine	8	4	3	1	21	12	4	5
Maryland	17	8	7	2	61	39	7	15
Massachusetts	24	10	12	2	63	42	19	2
Michigan	41	18	18	5	87	44	23	20
Minnesota	27	19	7	1	62	51	8	3
Mississippi	11	2	5	4	19	8	5	6
Missouri	29	13	12	4	71	48	12	11
Montana	24	14	5	5	48	33	6	9
Nebraska	15	7	6	2	31	15	7	9
Nevada	16	7	5	4	40	22	12	6
New Hampshire	17	9	8	—	40	30	10	—
New Jersey	54	21	27	6	151	99	38	14
New Mexico	12	5	5	2	24	12	7	5

(Continued on next page)

CIVIL HELICOPTER FLEET
UNITED STATES, CANADA, MEXICO AND PUERTO RICO (Continued)
1985

State	OPERATORS				HELICOPTERS			
	TOTAL	Commercial	Corp. and Exec.	Civil Gov't.	TOTAL	Commercial	Corp. and Exec.	Civil Gov't.
New York	77	27	41	9	198	98	72	28
North Carolina	19	7	8	4	37	14	14	9
North Dakota	17	12	4	1	39	31	5	3
Ohio	72	30	37	5	116	71	37	8
Oklahoma	36	21	13	2	125	107	13	5
Oregon	76	40	35	1	322	271	45	6
Pennsylvania	100	35	64	1	238	126	105	7
Rhode Island	6	2	3	1	7	2	4	1
South Carolina	23	12	7	4	59	46	7	6
South Dakota	5	4	—	1	9	8	—	1
Tennessee	31	12	15	4	69	33	17	19
Texas	217	72	132	13	548	259	244	45
Utah	26	17	8	1	130	116	13	1
Vermont	4	1	3	—	5	2	3	—
Virginia	36	10	19	7	64	25	24	15
Washington	86	50	29	7	208	148	43	17
West Virginia	39	7	29	3	48	11	30	7
Wisconsin	12	10	2	—	51	49	2	—
Wyoming	19	12	7	—	37	29	8	—
Puerto Rico	6	1	2	3	11	2	2	7
U.S. Total	2,221	1,002	963	256	6,412	4,244	1,391	777
Canada	217	125	75	17	1,236	1,008	131	97
Mexico	43	9	13	21	256	18	30	208
TOTAL	2,481	1,136	1,051	294	7,904	5,270	1,552	1,082

Source: Aerospace Industries Association, "Directory of Helicopter Operators in the United States, Canada, Mexico and Puerto Rico, 1985-86".

Outlays for U.S. industrial research and development, including both government and company-funded R&D, increased significantly in 1985, according to data supplied by the National Science Foundation (NSF). Combined outlays by all industries totaled $79.5 billion, an increase of more than 10 percent over 1984's $71.1 billion. NSF estimated that industrial R&D spending in 1986 will reach $87 billion, a further boost of almost 9.5 percent.

The aerospace industry, perennial leader among U.S. industries, once again headed the list in outlays, again including government/company funding, according to a study by McGraw-Hill Publications Company. With expenditures of $18.4 billion in 1985, aerospace topped the second place electrical machinery industry by more than $1 billion. In third place, at $10.5 billion, was the non-electrical machinery industry. McGraw-Hill estimated that the same three industries will place 1-2-3 in 1986, but that aerospace will widen its lead with outlays of $23.7 billion, compared with $19.5 billion for electrical machinery and $10.0 billion for non-electrical machinery.

In 1985, aerospace outlays amounted to about 23 percent of all U.S. spending for industrial R&D, according to McGraw-Hill, which estimates total business outlays at $79.7 billion, slightly higher than the NSF figure. In 1986, aerospace outlays as a percentage of the total will increase to more than 26 percent, McGraw-Hill indicated, estimating total all-industry outlays at $88.4 billion.

NSF data show that the aerospace industry leads all U.S. manufacturing industries when R&D funding is measured as a percentage of sales. In 1984, the latest year for which information was available, aerospace company funding for R&D (exclusive of government funds) amounted to 4.2 percent of net sales, compared with an average for all manufacturing industries of 2.6 percent. For the five-year period 1980-1984, aerospace R&D outlays as a percentage of sales averaged 4.3 percent; the figure for all manufacturing industries was 2.4 percent. When company and government funds were combined, the study found that aerospace outlays in 1984 came to 16.9 percent of sales, compared with the all-industry figure of 3.8 percent. For the five years of the 1980s, aerospace averaged 16.1 percent, all manufacturing industries 3.5 percent.

In 1985, total U.S. funding for R&D amounted to $108.8 billion, an increase of almost 12 percent over the previous year's $97.3 billion, according to another NSF compilation. This figure includes, in addition to the work performed by industry, R&D conducted by other organizations among government agencies, colleges and universities, federally-funded R&D centers and non-profit institutions. Industry performed more than 73 percent of the nation's R&D, government agencies about 12 percent, colleges and uni-

Research and Development

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versities almost nine percent. For 1986, NSF expects total R&D expenditures to reach $118.6 billion, a gain of nine percent over 1985.

Early Congressional actions on the FY 1987 budget suggested that the Administration's request would be scaled down significantly, but the Administration proposal provides at least a general indication of R&D activity. The President's budget asked $51.4 billion in federal outlays for R&D, which compares with $47.8 billion in FY 1986. As in the prior years of the 1980s, the bulk of the increase would be in outlays by the Department of Defense. Outlays by DoD and NASA would increase on an inflation-adjusted constant dollar basis, while outlays of the Department of Energy and other agencies would decline.

A Department of Defense analysis of outlays for research, development, test and evaluation (RDT&E) shows that Air Force RDT&E outlays far exceed those of the other services. In FY 1985, USAF outlays amounted to $11.6 billion; estimates for FY 1986 and 1987 were $11.3 billion and $12.6 billion. Navy outlays were listed as $8.1 billion (FY 85), $8.5 billion (FY 86) and $8.6 billion (FY 87). The comparable Army figures were $4.0 billion, $4.1 billion and $4.3 billion.

A geographical breakdown of FY 1985 DoD prime contract awards to industry, educational and other institutions shows the Pacific area again in first place with 36.6 percent of the total. In second place was the Middle Atlantic region with 14.3 percent, followed by New England and South Atlantic, both with 13.2 percent. The total value of contract awards was $18.6 billion, of which $16.2 billion (almost 90 percent) went to business firms.☐

FUNDS FOR INDUSTRIAL RESEARCH AND DEVELOPMENT ALL INDUSTRIES AND THE AEROSPACE INDUSTRY

By Funding Source
Calendar Years 1972-1986
(Millions of Dollars)

Year	All Industries[a]			Aerospace Industry[b]		
	Total	Federal Funds	Company Funds[c]	Total	Federal Funds	Company Funds[c]
CURRENT DOLLARS						
1972	$19,552	$ 8,017	$11,535	$ 4,950	$ 3,970	$ 978
1973	21,249	8,145	13,104	5,052	3,899	1,154
1974	22,887	8,220	14,667	5,278	4,000	1,278
1975	24,187	8,605	15,582	5,713	4,428	1,285
1976	26,997	9,561	17,436	6,339	4,921	1,418
1977	29,825	10,485	19,340	7,033	5,486	1,547
1978	33,304	11,189	22,115	7,536	5,713	1,823
1979	38,226	12,518	25,708	8,041	5,840	2,201
1980	44,505	14,029	30,476	9,198	6,628	2,570
1981	51,810	16,382	35,428	11,968	8,528	3,440
1982	57,995	18,483	39,512	13,658	9,776	3,882
1983[r]	63,403	20,542	42,861	13,853	10,405	3,448
1984	71,137	23,072	48,065	16,076	12,117	3,960
1985[E]	79,500	26,000	53,500	18,447	13,904	4,543
1986[E]	87,000	28,500	58,500	23,682	17,850	5,832
CONSTANT DOLLARS (1982 = 100)[d]						
1972	$42,056	$17,244	$24,812	$10,645	$ 8,538	$2,103
1973	42,893	16,441	26,452	10,206	7,877	2,331
1974	42,415	15,234	27,181	9,774	7,407	2,367
1975	40,781	14,509	26,272	9,634	7,467	2,167
1976	42,805	15,159	27,646	10,046	7,799	2,247
1977	44,330	15,584	28,746	10,450	8,152	2,299
1978	46,115	15,493	30,622	10,438	7,913	2,525
1979	48,652	15,932	32,720	10,230	7,430	2,800
1980	51,919	16,366	35,553	10,733	7,734	2,999
1981	55,140	17,435	37,705	12,732	9,072	3,660
1982	57,995	18,483	39,512	13,658	9,776	3,882
1983[r]	61,047	19,779	41,268	13,346	10,024	3,322
1984	65,813	21,345	44,468	14,871	11,209	3,663
1985[E]	71,166	23,274	47,892	16,515	12,448	4,067
1986[E]	75,246	24,650	50,596	20,468	15,428	5,041

Source: National Science Foundation, for historical data and All Industries estimates; McGraw-Hill Publications Company for Aerospace Industry Total estimates; AIA for Aerospace Industry Federal/Company estimates. The McGraw-Hill estimates for All Industries are $79,725 million for 1985 and $88,445 million for 1986.

NOTE: Detail may not add to totals because of rounding.

[a] Includes all manufacturing industries, plus those non-manufacturing industries known to conduct or finance research and development.

[b] Companies classified in SIC codes 372 and 376, having as their principal activity the manufacture of aircraft, guided missiles, space vehicles, and parts.

[c] Company funds include all funds for industrial R&D work performed within company facilities except funds provided by the Federal Government. Excluded are company-financed research and development contracted to outside organizations such as research institutions, universities and colleges, or other non-profit organizations.

[d] Based on GNP implicit price deflator.

[E] Estimate.

[r] Revised.

TOTAL U.S. FUNDS FOR RESEARCH AND DEVELOPMENT BY SOURCE AND PERFORMER[a]

Calendar Years 1983-1986
(Millions of Current Dollars)

Source of Funds	Total All Performers	Performer				
		Federal Government	Industry	Colleges & Universities	Federally-Funded Research & Development Centers	Nonprofit Institutions
1983						
All Sources—TOTAL	$ 87,178	$10,582	$63,403	$7,781	$2,737	$2,675
Federal Government	40,667	10,582	20,542	4,956	2,737	1,850
Industry	43,514	—	42,861	378	—	275
Colleges & Universities	1,864	—	—	1,864	—	—
Nonprofit Institutions	1,133	—	—	583	—	550
1984[p]						
All Sources—TOTAL	$ 97,275	$11,572	$71,137	$8,473	$3,118	$2,975
Federal Government	45,249	11,572	23,072	5,387	3,118	2,100
Industry	48,821	—	48,065	456	—	300
Colleges & Universities	2,000	—	—	2,000	—	—
Nonprofit Institutions	1,205	—	—	630	—	575
1985[E]						
All Sources—TOTAL	$108,800	$13,150	$79,500	$9,500	$3,400	$3,250
Federal Government	50,915	13,150	26,000	6,050	3,400	2,315
Industry	54,385	—	53,500	550	—	335
Colleges & Universities	2,200	—	—	2,200	—	—
Nonprofit Institutions	1,300	—	—	700	—	600
1986[E]						
All Sources—TOTAL	$118,600	$14,000	$87,000	$10,600	$3,600	$3,400
Federal Government	55,250	14,000	28,500	6,750	3,600	2,400
Industry	59,475	—	58,500	600	—	375
Colleges & Universities	2,500	—	—	2,500	—	—
Nonprofit Institutions	1,375	—	—	750	—	625

Source: National Science Foundation.
a Source performer detail not available by industry.
p Preliminary.
E Estimate.

FUNDS FOR INDUSTRIAL RESEARCH AND DEVELOPMENT[a] BY INDUSTRY

Calendar Years 1984-1986
(Millions of Dollars)

Industry	Current Dollars[a]			Constant Dollars[b]		
	1984[p]	1985[E]	1986[E]	1984[p]	1985[E]	1986[E]
ALL BUSINESS	$71,388	$79,725	$88,445	$66,039	$71,374	$76,443
ALL MANUFACTURING	68,755	76,709	85,045	63,603	68,674	73,505
Aerospace	$16,076	$18,447	$23,682	$14,871	$16,515	$20,468
Electrical Machinery	15,400	17,440	19,476	14,246	15,613	16,833
Non-Electrical Machinery	9,671	10,468	9,962	8,946	9,372	8,610
Chemicals	8,024	8,999	9,503	7,423	8,056	8,213
Autos, Trucks & Parts	6,380	7,544	8,021	5,902	6,754	6,933
Instruments	4,910	5,483	5,649	4,542	4,909	4,882
Petroleum	2,200	1,908	2,163	2,035	1,708	1,869
Rubber & Plastic	1,120	1,130	1,134	1,036	1,012	980
Food & Beverage	833	901	952	771	807	823
Paper & Pulp	782	744	702	723	666	607
Iron & Steel	620	671	642	574	601	555
Fabricated Metals	756	725	739	699	649	639
Stone, Clay & Glass	560	655	682	518	586	589
Nonferrous Metals	473	578	625	438	517	540
Textiles	144	158	167	133	141	144
Other Manufacturing	806	856	945	746	766	817

Source: McGraw-Hill Publications Company.

[a] McGraw-Hill data, based on 1984 preliminary figures from the National Science Foundation plus estimates from the McGraw-Hill annual spring survey of plans for business R&D spending.

[b] Based on GNP implicit price deflator, 1982 = 100. Detail may not add to totals because of rounding.

[p] Preliminary.

[E] Estimate.

FUNDS FOR INDUSTRIAL RESEARCH AND DEVELOPMENT IN THE AEROSPACE INDUSTRY

By Type of Research and Funding Source
Calendar Years 1962-1983[a]
(Millions of Dollars)

Year	TOTAL AEROSPACE	Basic Research			Applied Research			Development		
		Total	Federal Funds	Company Funds	Total	Federal Funds	Company Funds	Total	Federal Funds	Company Funds
1962	$ 4,042	$ 54	$28	$26	$ 789	$664	$125	$ 3,198	$2,897	$ 301
1963	4,712	59	31	28	735	585	150	3,917	3,634	283
1964	5,078	67	34	34	766	607	159	4,244	3,948	296
1965	5,148	71	41	30	735	563	172	4,342	3,921	421
1966	5,526	69	36	33	773	563	210	4,685	4,162	523
1967	5,669	71	33	38	726	490	236	4,871	4,071	800
1968	5,765	68	26	42	677	426	251	5,021	4,145	876
1969	5,882	65	24	41	597	347	250	5,220	4,216	1,004
1970	5,219	63	20	43	565	352	213	4,591	3,718	873
1971	4,881	54	37	17	461	279	182	4,365	3,583	782
1972	4,950	60	44	16	451	267	184	4,438	3,722	716
1973	5,052	50	21	29	512	308	204	4,491	3,633	858
1974	5,278	51	19	32	609	360	249	4,617	3,735	882
1975	5,713	54	17	37	614	381	233	5,044	4,119	925
1976	6,339	54	21	33	666	365	301	5,619	4,521	1,098
1977[a]	7,033	56	25	31	753	419	334	6,223	5,017	1,206
1979	8,041	86	44	42	880	499	381	7,076	5,314	1,762
1981	11,968	131	60	71	1,484	897	587	10,353	7,738	2,615
1983	13,853	137	NA	NA	3,455	NA	NA	10,261	7,683	2,578

Source: National Science Foundation, plus estimates by AIA to adjust originally-published breakouts by Research Type and Funding Source to NSF's revised totals.

NOTE: Detail may not add to totals because of rounding.

[a] Break-outs by Research Type and Funding Source available only for odd-numbered years after 1977.

NA Not available.

RESEARCH AND DEVELOPMENT FUNDS AS PERCENT OF NET SALES ALL MANUFACTURING INDUSTRIES AND THE AEROSPACE INDUSTRY

Calendar Years 1970-1984

Year	All Manufacturing Industries[a]		Aerospace Industry[b]	
	Total R&D Funds as Percent of Net Sales	Company R&D Funds as Percent of Net Sales	Total R&D Funds as Percent of Net Sales	Company R&D Funds as Percent of Net Sales
1970	3.7%	2.2%	16.2%	3.8%
1971	3.5	2.1	16.2	3.4
1972	3.4	2.0	16.6	3.3
1973	3.3	2.0	13.3	3.0
1974	3.1	2.0	14.1	3.5
1975	3.1	2.0	12.7	2.8
1976	3.1	2.0	12.7	2.8
1977	2.9	2.0	13.3	2.9
1978	2.9	2.0	13.3	3.2
1979	2.6	1.9	12.9	3.5
1980	3.0	2.1	13.7	3.8
1981	3.1	2.2	16.0	4.6
1982	3.8	2.6	17.7	5.0
1983[r]	3.9	2.6	16.2	4.0
1984	3.8	2.6	16.9	4.2

Source: National Science Foundation.

[a] Includes all manufacturing industries known to conduct or finance research and development.

[b] Companies classified in SIC codes 372 and 376, having as their principal activity the manufacture of aircraft, guided missiles, space vehicles, and parts.

[r] Revised.

FUNDS FOR ENERGY RESEARCH AND DEVELOPMENT ALL INDUSTRIES AND THE AEROSPACE INDUSTRY

Calendar Years 1980-1984
(Millions of Dollars)

	1980	1981	1982	1983[r]	1984
All Industries[a]—**TOTAL**	$4,162	$4,216	$4,287	$4,396	$4,519
Federal Funds	1,563	1,536	1,489	1,519	1,508
Company Funds	2,599	2,680	2,798	2,877	3,011
Aerospace Industry[b]—**TOTAL**	$ 446	$ 412	$ 346	$ 377	$ 571
Federal Funds	283	288	258	NA	439
Company Funds	163	124	88	NA	132

Source: National Science Foundation.

[a] Includes all manufacturing industries, plus those non-manufacturing industries known to conduct or finance research and development.

[b] Companies classified in SIC codes 372 and 376, having as their principal activity the manufacture of aircraft, guided missiles, space vehicles, and parts.

NA Not available.

[r] Revised.

FEDERAL AERONAUTICS RESEARCH AND DEVELOPMENT

Fiscal Years 1969-1986
(Millions of Dollars)

Year	TOTAL	NASA[a]	DOD[b]	DOT[c]
BUDGET AUTHORITY				
1969	$1,300	$169	$1,161	$(30)[d]
1970	1,882	199	1,641	42
1971	1,990	210	1,707	73
1972	2,295	236	1,964	95
1973	2,187	313	1,799	75
1974	2,030	278	1,678	74
1975	2,015	314	1,627	74
1976	2,351	325	1,941	85
Tr. Qtr.	584	83	480	22
1977	2,727	378	2,256	93
1978	3,338	437	2,807	94
1979	2,850	519	2,240	91
1980	2,991	560	2,336	95
1981	3,286	526	2,653	106
1982	3,581	516	2,984	81
1983	3,871	547	3,221	103
1984	4,087	600	3,224	263
1985[E]	4,331	633	3,433	265
1986[E]	5,687	622	4,868	197
OUTLAYS				
1982[f]	$3,309	$563	$2,657	$89
1983	3,554	563	2,920	71
1984	3,727	586	2,995	146
1985[E]	4,108	631	3,177	300
1986[E]	4,861	616	4,049	196

Source: NASA, "Aeronautics and Space Report of the President" (Annually).

[a] Research and Development, Construction of Facilities, Research and Program Management.

[b] Research, Development, Testing and Evaluation of aircraft and related equipment.

[c] Federal Aviation Administration Research, Engineering and Development, and Facilities, Engineering and Development.

[d] Unobligated balances for SST research and development, rescinded in 1969.

[E] Estimate. Latest year reflects Administration's budget proposal.

[f] First year outlays data available.

FEDERAL OUTLAYS FOR CONDUCT OF RESEARCH AND DEVELOPMENT

Fiscal Years 1971-1987
(Millions of Dollars)

Year	TOTAL	DOD	NASA	Energy[a]	Other
CURRENT DOLLARS					
1971	$15,050	$ 7,541	$3,382	$1,303	$2,824
1972	16,629	8,275	3,422	1,552	3,380
1973	17,407	8,574	3,315	1,623	3,895
1974	18,239	8,956	3,256	1,825	4,202
1975	19,525	9,341	3,266	2,277	4,641
1976	20,233	9,329	3,521	2,225	5,158
1977	22,462	10,176	3,763	3,181	5,342
1978	24,532	10,726	3,833	3,925	6,048
1979	26,578	11,454	4,064	4,413	6,648
1980	30,351	13,451	4,711	4,698	7,492
1981	34,252	15,720	5,279	5,121	8,132
1982	34,509	18,201	3,220	4,974	8,114
1983	36,560	21,057	2,538	4,771	8,193
1984	40,518	23,583	3,539	4,702	8,694
1985	45,244	27,878	2,970	4,900	9,496
1986[E]	47,832	29,267	3,528	4,778	10,259
1987[E]	51,418	32,693	3,743	4,819	10,163
CONSTANT DOLLARS (1982 = 100)[b]					
1971	$34,471	$17,272	$7,746	$2,984	$6,468
1972	36,103	17,966	7,429	3,370	7,338
1973	36,002	17,733	6,856	3,357	8,056
1974	34,967	17,170	6,242	3,499	8,056
1975	33,945	16,240	5,678	3,959	8,068
1976	32,592	15,027	5,672	3,584	8,309
1977	33,510	15,181	5,614	4,746	7,970
1978	34,205	14,955	5,344	5,473	8,433
1979	34,118	14,703	5,217	5,665	8,534
1980	35,817	15,873	5,559	5,544	8,841
1981	36,743	16,863	5,663	5,493	8,723
1982	34,509	18,201	3,220	4,974	8,114
1983	35,070	20,199	2,435	4,576	7,859
1984	37,385	21,760	3,265	4,338	8,022
1985	40,306	24,836	2,646	4,365	8,460
1986[E]	41,245	25,237	3,042	4,120	8,846
1987[E]	42,596	27,084	3,101	3,992	8,419

Source: "The Budget of the United States Government, Special Analyses, (Annually).

NOTE: Detail may not add to totals because of rounding.

[a] Energy research and development programs transferred from AEC to ERDA with 1974 reorganization and to Dept. of Energy in 1977.

[b] Based on Fiscal Year GNP implicit price deflator.

[E] Estimate. Latest year reflects Administration's budget proposal.

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR RESEARCH, DEVELOPMENT, TEST AND EVALUATION

Fiscal Years 1985-1987
(Millions of Dollars)

	1985	1986^E	1987^E
TOTAL—APPROPRIATIONS FOR RDT&E	$30,870	$35,467	$41,930
BY APPROPRIATION			
Army	$ 4,305	$ 4,841	$ 5,550
Navy	9,071	10,077	10,587
Air Force	13,283	13,787	17,275
Defense Agencies	4,151	6,642	8,364
Director of Test & Evaluation, Defense	59	119	142
Director of Operational Test & Evaluation	—	—	11
BY RESEARCH CATEGORIES			
Research	$ 852	$ 1,024	$ 986
Exploratory Development	2,268	2,425	2,599
Advanced Development	6,743	9,875	12,776
Engineering Development	10,491	10,149	11,717
Management and Support	2,517	2,611	2,973
Operational Systems Development	7,998	9,382	10,879
RECAP OF BUDGET ACTIVITIES			
Technology Base	$ 3,121	$ 3,449	$ 3,585
Advanced Technology Development	2,751	4,234	6,575
Strategic Programs	8,169	8,054	9,430
Tactical Programs	9,062	10,901	12,671
Intelligence and Communications	3,953	4,703	5,103
Defensewide Mission Support	3,814	4,125	4,566
RECAP OF FYDP PROGRAMS			
Strategic Forces	$ 777	$ 1,109	$ 1,392
General Purpose Forces	1,931	2,016	2,579
Intelligence and Communications	5,025	5,931	6,589
Airlift/Sealift	36	80	112
Guard and Reserve	—	—	5
Research & Development (FYDP Program 6)	22,871	26,085	31,051
Central Supply and Maintenance	213	235	192
Training, Medical and Other	5	5	5
Administration & Assoc. Activities	5	—	—
Support of Other Nations	5	5	4

Source: Department of Defense Budget, "R,D,T&E Programs (R-1)" (Annually).
NOTE: Detail may not add to totals because of rounding.
E Estimate. Latest year reflects Administration's budget proposal.

DEPARTMENT OF DEFENSE
OUTLAYS FOR RESEARCH, DEVELOPMENT, TEST AND EVALUATION

Fiscal Years 1970-1987
(Millions of Dollars)

Year	TOTAL, All RDT&E Functions	Air Force	Navy	Army	Other
1970	$ 7,166	$ 2,937	$2,084	$1,665	$ 480
1971	7,303	2,809	2,405	1,569	520
1972	7,881	3,205	2,427	1,779	470
1973	8,157	3,362	2,404	1,912	479
1974	8,582	3,240	2,623	2,190	529
1975	8,866	3,308	3,021	1,964	573
1976	8,923	3,338	3,215	1,842	528
Tr. Qtr.	2,203	830	778	437	161
1977	9,795	3,618	3,481	2,069	627
1978	10,508	3,626	3,825	2,342	715
1979	11,152	4,080	3,826	2,409	837
1980	13,127	5,017	4,382	2,707	1,021
1981	15,278	6,341	4,783	2,958	1,196
1982	17,729	7,794	5,240	3,230	1,465
1983	20,554	9,182	5,854	3,658	1,861
1984	23,117	10,353	6,662	3,812	2,289
1985	27,103	11,573	8,054	3,950	3,526
1986[E]	28,702	11,271	8,524	4,088	4,819
1987[E]	31,618	12,611	8,570	4,321	6,116

Source: Department of Defense Budget (Annually)

[E] Estimate. Latest year reflects Administration's budget proposal.

DEPARTMENT OF DEFENSE PRIME CONTRACT AWARDS FOR RESEARCH, DEVELOPMENT, TEST AND EVALUATION

Fiscal Years 1981-1985
(Millions of Dollars)

Program Categories	1981	1982	1983	1984	1985
TOTAL—RDT&E	$10,483	$14,882	$16,301	$18,277	$18,938
Research	694	685	763	957	1,142
Exploratory Development	1,081	1,285	1,261	1,246	1,716
Other Development	8,233	12,537	13,915	15,616	15,432
Management & Support	474	375	362	459	648
Aircraft—TOTAL	$ 739	$ 2,906	$ 2,072	$ 2,316	$ 2,304
Research	4	14	36	95	130
Exploratory Development	58	139	152	142	139
Other Development	672	2,740	1,879	2,074	2,025
Management & Support	6	13	6	4	9
Missile and Space Systems—TOTAL	4,603	5,648	6,444	7,296	7,119
Research	27	14	34	14	23
Exploratory Development	277	322	239	224	385
Other Development	4,184	5,265	6,097	6,937	6,583
Management & Support	115	48	73	120	127
Electronics & Communications Equipment—TOTAL	2,582	3,534	4,681	4,644	4,718
Research	74	77	76	95	126
Exploratory Development	305	351	404	397	394
Other Development	2,110	3,049	4,127	4,042	4,083
Management & Support	93	57	75	111	115
All Other—TOTAL[a]	2,558	2,794	3,104	4,021	4,797
Research	589	581	617	753	863
Exploratory Development	441	473	466	483	798
Other Development	1,268	1,482	1,812	2,561	2,741
Management & Support	260	257	208	224	397

Source: Department of Defense, "Prime Contract Awards by Service Category and Federal Supply Classification" (Annually).
NOTE: Detail may not add to totals because of rounding.
[a] "All Other" includes ships, tank-automative, weapons, ammunition, services, and other.

DEPARTMENT OF DEFENSE
NET VALUE OF PRIME CONTRACT AWARDS OVER $25,000[a] FOR RESEARCH, DEVELOPMENT, TEST & EVALUATION

By Region and Type of Contractor
Fiscal Year 1985

REGION	TOTAL	Type of Contractor		
		Educational Institutions	Other Non-Profit Institutions[a]	Business Firms
TOTAL—Millions of Dollars	$18,626	$1,288	$1,158	$16,181
New England	$ 2,456	$ 414	$ 552	$ 1,490
Middle Atlantic	2,655	117	38	2,499
East North Central	779	70	74	636
West North Central	932	13	3	916
South Atlantic	2,456	398	91	1,967
East South Central	299	9	5	284
West South Central	927	53	14	861
Mountain	1,298	69	1	1,228
Pacific[b]	6,822	145	379	6,299
PERCENT OF TOTAL	100.0%	100.0%	100.0%	100.0%
New England	13.2%	32.1%	47.7%	9.2%
Middle Atlantic	14.3	9.1	3.3	15.4
East North Central	4.2	5.4	6.4	3.9
West North Central	5.0	1.0	0.3	5.7
South Atlantic	13.2	30.9	7.9	12.2
East South Central	1.6	0.7	0.5	1.8
West South Central	5.0	4.1	1.2	5.3
Mountain	7.0	5.4	0.1	7.6
Pacific[b]	36.6	11.3	32.7	38.9

Source: Department of Defense, "Prime Contract Awards by Region and State" (Annually).
NOTE: Detail may not add to totals because of rounding.
[a] Includes contracts with other government agencies.
[b] Includes Alaska and Hawaii.

MISSILE PROGRAMS
RESEARCH, DEVELOPMENT, TEST AND EVALUATION[a]

By Agency, Type and Model
Fiscal Years 1985, 1986 and 1987
(Millions of Dollars)

Agency, Type and Model	1985	1986[E]	1987[E]
AIR FORCE			
AGM-130	$ 16.7	$ 29.2	$ 44.1
ALCM	18.9	10.9	6.1
AMRAAM[b]	204.3	101.3	39.1
*ASMS	99.5	159.8	176.9
GLCM	18.6	0.7	7.4
Peacekeeper (M-X)	1,524.6	695.6	330.6
Small ICBM in Hard Mobile Basing	465.2	624.5	1,396.2
SRAM II	12.4	34.1	164.7
NAVY			
Harm[b]	$ 5.9	$ 4.5	$ 6.3
Harpoon	—	11.7	37.5
Hawk[f]	21.5	5.1	10.7
Laser Maverick	2.0	—	—
RAM	47.8	10.9	24.2
Sidearm[g]	1.8	3.9	—
Sidewinder	—	13.5	24.8
Sparrow	—	5.0	3.1
Standard	31.6	45.5	46.0
Tomahawk	71.9	62.0	68.4
Trident II	2,010.8	2,104.4	1,632.9
VLA	30.6	41.1	41.7
ARMY			
*Advanced Anti-Tank Weapon System	$ 6.0	$ 60.3	$ 48.7
*ATACMS	76.4	101.5	88.2
Chaparral	17.9	17.5	5.6
Laser Hellfire[c]	27.6	6.7	11.9
Patriot	61.1	50.8	40.2
Stinger	5.0	23.3	6.3
TOW 2	11.9	11.7	12.5

Source: "Program Acquisition Costs by Weapon System," Department of Defense Budget (Annually).
NOTE: See Missile Programs Chapter for missile program procurement authorization data.
E Estimate. Latest year reflects Administration's budget proposal.
a Total Obligational Authority.
b Navy and Air Force funding.
c Army and Navy funding.
d Army and Air Force funding.
e Funds transferred to DoD Strategic Defense Initiatives in FY1985.
f Marine Corps funding.
g Navy and Marine Corps funding.
* Programs in R&D only.

MILITARY AIRCRAFT PROGRAMS RESEARCH, DEVELOPMENT, TEST AND EVALUATION[a]

By Agency, Type and Model
Fiscal Years 1985, 1986 and 1987
(Millions of Dollars)

Agency, Type and Model	1985	1986[E]	1987[E]
AIR FORCE			
AC-130	$ —	$ —	$ 46.8
*Advanced Tactical Fighter[b]	90.9	164.6	294.1
*Aircraft Engine Component Improvement Program	222.5	183.2	207.0
B-1B	462.5	271.6	118.7
C-17	120.0	372.8	612.3
F-15 C/D/E	189.5	230.0	209.0
F-16 Multimission Fighter (Falcon)	91.4	66.3	81.3
HH-60A	34.0	9.7	—
LANTIRN (Night Precision Attack)	97.8	39.8	40.1
MC-130H Combat Talon[b]	—	19.2	18.8
Precision Location Strike System (PLSS)	76.9	61.5	26.6
Range Control Aircraft	1.5	0.8	—
T-46A Trainer	76.7	52.8	10.8
TR-1/U-2	—	—	23.5
VC-X (Air Force One Replacement)	—	19.5	9.0
NAVY			
A-6E/F Intruder	$ 68.7	$236.1	$143.3
AH-1T Sea Cobra	6.7	—	4.6
AV-8B	61.3	65.3	48.6
CH/MH-53E Super Stallion	15.0	1.2	3.5
E-2C Hawkeye	34.4	23.6	34.5
E-6A	67.6	86.0	81.7
EA-6B Prowler	35.8	78.2	69.7
F-14 A/D Tomcat	276.7	347.9	268.4
F/A-18 Hornet	31.2	58.3	59.1
*Joint Services Adv. Vert. Lift Aircraft (U-22)	178.2	559.7	391.8
P-3C Orion	24.9	33.1	96.9
SH-2F Seasprite (LAMPS MK-I)	13.9	0.8	—
SH-60B Seahawk (LAMPS MK-III)	11.3	14.0	19.7
SH-60F CV ASW	19.1	12.4	8.1
T-45 Training System	67.5	116.0	134.2
ARMY			
AH-64 Attack Helicopter	$ 27.7	$ 9.9	$ 12.1
OH-58D AHIP Modification	25.2	6.7	—
UH-60A Blackhawk[d]	—	16.8	—
*ARTI/LHX	51.6	44.3	44.4

Source: "Program Acquisition Costs by Weapon System," Department of Defense Budget (Annually).

NOTE: See Aircraft Production Chapter for aircraft program procurement authorization data.

[a] Total Obligational Authority.

[b] Air Force and Navy funding.

[c] Air Force, Navy and Marine Corps funding.

[d] Army, Navy and Air Force funding.

[E] Estimate. Latest year reflects Administration's budget proposal.

* Programs in R&D only.

In 1985, the United States experienced its 10th consecutive international trade deficit which, at $136.6 billion, was the worst in the nation's history. By contrast, the U.S. aerospace industry, the nation's leading manufacturing segment, set an all-time record for export volume and recorded one of its best-ever trade balances.

The 1985 aerospace trade balance was $12.6 billion, which compares with $10.1 billion in 1984 and the all-time high of $13.1 billion in 1981. The 1985 surplus was achieved despite the greatest-ever influx of aerospace imports. The industry exported aerospace products and services valued at $18.7 billion, while aerospace imports amounted to $6.1 billion.

The composition of the aerospace export volume was 69 percent civil products, 31 percent military, which represents a moderate increase in the civil side of the ratio; in 1984, it was 64 percent civil, 36 percent military. Civil exports gained by more than $3.2 billion, from 1984's $9.7 billion to $12.9 billion in 1985. The gain was sparked by a sharp increase in exports of civil transport aircraft after a major decline in the previous year. Deliveries of transports to foreign customers accounted for $5.5 billion (up $2.3 billion) and reinforced predictions that the erratic jetliner export curve would start a new ascent.

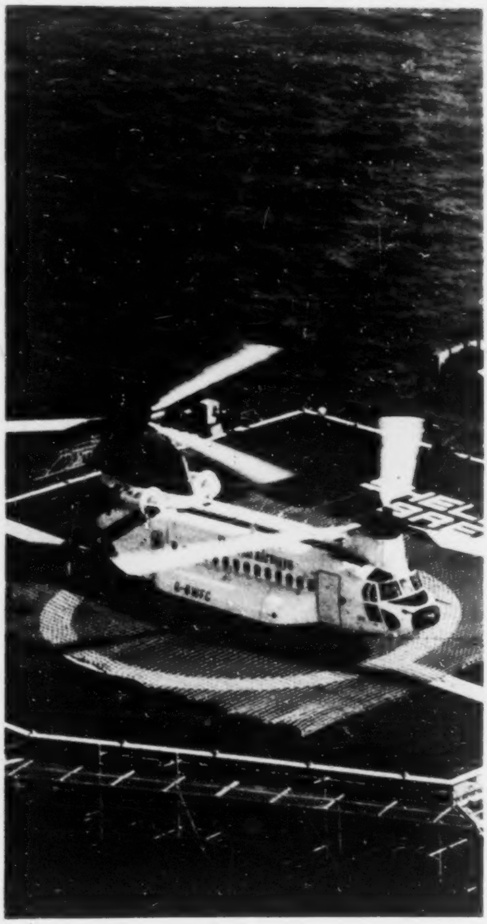
Aerospace exports in 1985 amounted to nine percent of total U.S. exports, the highest figure in 15 years; it compares with 7.1 percent in 1984 and an average for the five-year span 1980-84 of 7.5 percent.

Within the civil exports category, the largest dollar volume was in sales of complete aircraft, a reversal of the previous year's order when sales of aircraft and engine parts led. For 1985, export sales of complete aircraft totaled $6.7 billion (up from $4.1 billion in 1984); sales of aircraft and engine parts amounted to $5.3 billion (up from $4.5 billion); and sales of aircraft engines were $923 million (down from $1.1 billion).

Exports of general aviation aircraft, in decline for several years, fell off further to $191 million, compared with the previous year's $268 million. Exports of civil helicopters dipped from $234 million in 1984 to $210 million in 1985.

Foreign Trade

86 87



Military exports totaled $5.8 billion, up from the previous year's $5.4 billion. The gain was due almost entirely to increased deliveries of complete aircraft; the value of such deliveries in 1985 was $2 billion, compared with $1.6 billion in 1984. A breakdown of other components of the military export volume shows aircraft and engine parts at $2.8 billion (up from $2.7 billion); guided missile and rockets $825 million (down from $962 million); and aircraft engines $146 million (up from $141 million).

The record aerospace import figure of $6.1 billion was $1.2 billion higher than the prior (1984) record. Most of the gain was in civil imports, which totaled $5 billion; military exports, mostly aircraft engine parts, amounted to $1.1 billion, nearly the same as in 1984.

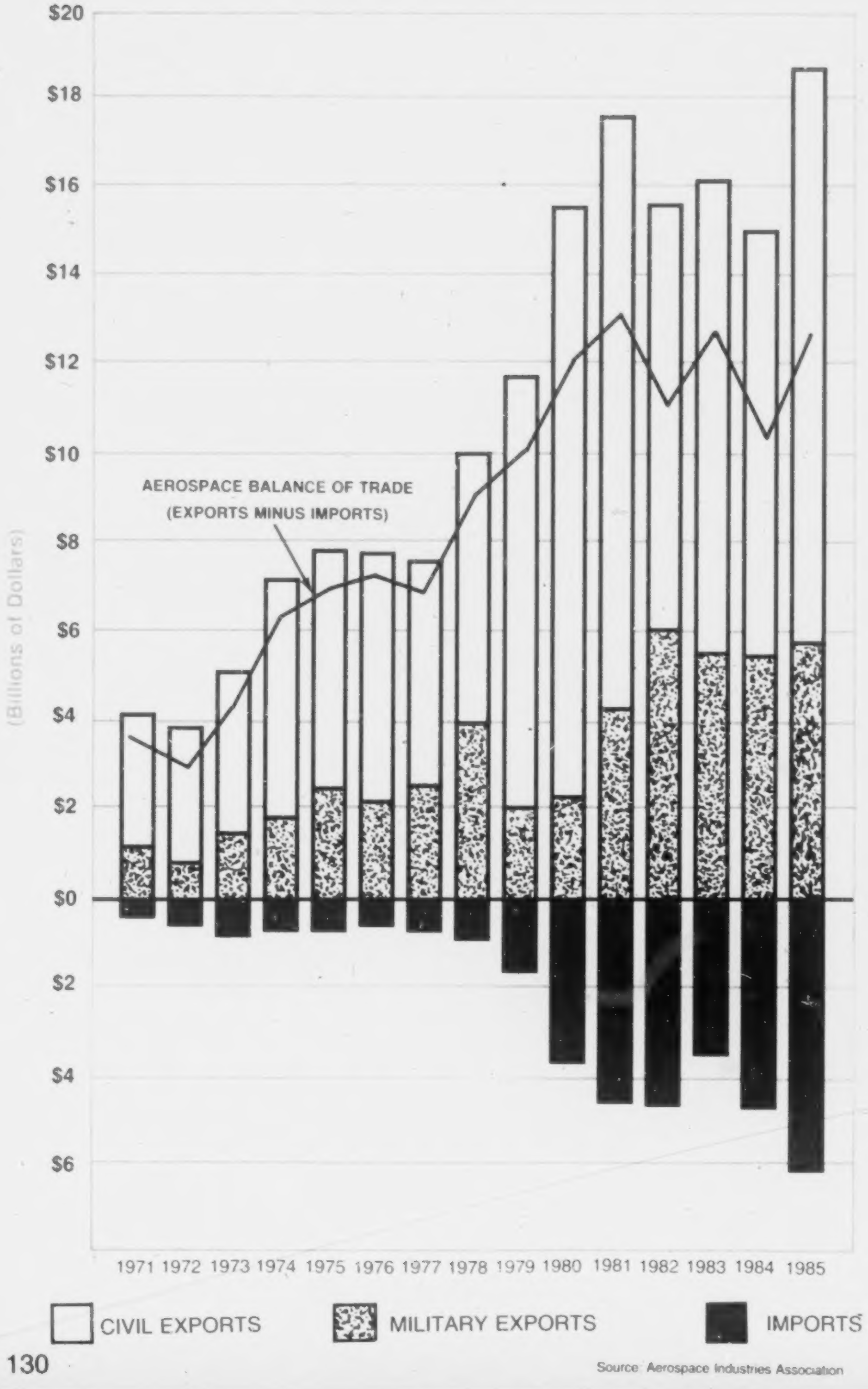
Within the civil imports category, there were major increases in each of the three main subdivisions: complete aircraft, up $200 million to $1.5 billion; aircraft engines, up more than $250 million to $1 billion; and aircraft and engine parts, up more than $700 million to $2.5 billion.

A big part of the increase in import sales of complete aircraft was in commercial transports; foreign aircraft manufacturers delivered 29 such transports worth almost $600 million. General aviation imports increased from $612 million in 1984 to $673 million in 1985. Helicopter imports, which have declined consistently since 1981, dropped to $45 million from $51 million in 1984.

The major regions of destination for U.S. commercial transport exports were Asia, 49 aircraft valued at $2.1 billion, and Europe, 72 aircraft worth $2 billion. The major recipients of U.S. aerospace exports in general were Japan (products valued at $1.8 billion), the United Kingdom ($1.6 billion), Australia ($1 billion) and France ($1 billion).

The principal countries of origin for aerospace imports were France ($1.7 billion), Canada ($1.6 billion) and the United Kingdom ($1.6 billion).□

AEROSPACE EXPORTS, IMPORTS, AND TRADE BALANCE



Source: Aerospace Industries Association

U.S. TOTAL AND AEROSPACE FOREIGN TRADE[a]

Calendar Years 1961-1985
(Millions of Dollars)

Year	Total U.S. Merchandise Trade			Aerospace		
	Trade Balance	Exports	Imports	Trade Balance	Exports	Imports
1961	$ 6,096	$ 20,754	$ 14,658	$ 1,501	$ 1,653	$ 152
1962	4,180	20,431	16,251	1,795	1,923	128
1963	6,061	23,062	17,001	1,532	1,627	95
1964	7,555	26,156	18,601	1,518	1,608	90
1965	5,875	27,127	21,252	1,459	1,618	159
1966	4,524	29,884	25,360	1,370	1,673	303
1967	4,409	31,142	26,733	1,961	2,248	287
1968	1,133	34,199	33,066	2,661	2,994	333
1969	1,599	37,462	35,863	2,831	3,138	307
1970	2,834	42,590	39,756	3,097	3,405	308
1971	(2,024)[b]	43,492	45,516	3,830	4,203	373
1972	(6,351)	48,959	55,310	3,230	3,795	565
1973	1,222	70,246	69,024	4,360	5,142	782
1974	(2,996)[b]	97,144	100,140	6,350	7,095	745
1975	9,630	106,561	96,931	7,045	7,792	747
1976	(7,786)	113,666	121,452	7,267	7,843	576
1977	(28,970)	119,006	147,976	6,850	7,581	731
1978	(33,541)	141,228	174,769	9,058	10,001	943
1979	(30,272)	178,798	209,070	10,123	11,747	1,624
1980	(27,336)	216,672	244,008	11,952	15,506	3,554
1981	(30,051)	228,961	259,012	13,134	17,634	4,500
1982	(35,182)	207,158	242,340	11,035	15,603	4,568
1983	(60,710)	195,969	256,679	12,619	16,065	3,446
1984	(110,932)	212,057	322,989	10,082[r]	15,008	4,926[r]
1985	(136,627)	206,925	343,552	12,592	18,724	6,132

Source: Bureau of the Census, "Highlights of U.S. Export and Import Trade," Report FT990 (Monthly); "U.S. Exports, Schedule B, Commodity by Country," Report FT446 (Annually); "U.S. Imports for Consumption and General Imports, TSUSA Commodity and Country of Origin," Report FT 246 (Annually).

[a] Total U.S. and aerospace foreign trade are reported as (1) exports of domestic merchandise, including Department of Defense shipments, f.a.s. (= free alongside ship) basis, not seasonally adjusted, (2) imports for consumption, customs value basis, not seasonally adjusted, and (3) the difference (surplus or deficit) between exports and imports.

[b] First U.S. trade deficit since 1888.

[r] Revised.

U.S. EXPORTS OF AEROSPACE PRODUCTS[a] BY MAJOR COUNTRIES OF DESTINATION

Calendar Years 1981-1985
(Millions of Dollars)

Major Countries of Destination	1981	1982	1983	1984	1985
Australia	$ 622	$ 312	$ 390	$ 445	$1,034
Belgium/Luxembourg	263	213	281	247	216
Canada	1,252	909	1,014	1,121	964
Egypt	46	163	94	292	102
France	1,220	1,182	1,190	1,011	1,014
Germany, West	1,208	910	594	651	967
Israel	231	237	430	444	333
Italy	644	253	323	469	725
Japan	1,470	1,094	1,540	1,305	1,792
Korea, South	419	275	274	382	536
Netherlands	397	302	401	331	217
Saudi Arabia	692	525	380	419	687
Singapore	222	178	549	691	641
Taiwan	308	391	266	264	358
United Kingdom	1,075	736	1,087	1,276	1,566

Source: U.S. Department of Commerce, International Trade Administration.

[a] Includes all civil products, f.a.s. basis, excludes military products, which are not reported by country of destination.

U.S. IMPORTS OF AEROSPACE PRODUCTS[a] BY MAJOR COUNTRIES OF ORIGIN

Calendar Years 1981-1985
(Millions of Dollars)

Major Countries of Origin	1981	1982	1983	1984	1985
Canada	$1,311	$1,200	$1,018	$1,397	$1,552
France	826	827	726	1,109	1,673
Germany, West	101	97	124	121	229
Israel	156	126	73	142	132
Italy	92	124	113	143	138
Japan	160	200	177	173	185
Netherlands	99	109	49	124	219
Singapore	23	30	36	100	114
United Kingdom	1,311	1,122	933	1,163	1,562

Source: U.S. Department of Commerce, International Trade Administration.

[a] Includes civil and military products, c.i.f. basis.

U.S. IMPORTS OF AEROSPACE PRODUCTS

Calendar Years 1981-1985
(Millions of Dollars)

Aerospace Imports	1981	1982	1983	1984[r]	1985
TOTAL	$4,500	$4,568	$3,446	$4,926	$6,132
TOTAL CIVIL	$3,909	$3,875	$2,927	$3,787	$4,984
Complete Aircraft—TOTAL	$1,558	$1,599	$ 924	$1,301	$1,502
Transports	196	231	188	270	599
General Aviation	913	838	542	612	673
Helicopters	105	85	90	51	45
Other, Including Used Aircraft, & Gliders, Balloons, & Airships	344	445	104	368	185
Aircraft Engines—TOTAL	1,046	797	617	750	1,019
Turbine Engines	1,041	787	602	738	1,011
Piston Engines	5	10	15	12	8
Aircraft and Engine Parts—TOTAL	1,305	1,479	1,386	1,736	2,463
Aircraft Parts and Accessories	230	301	267	320	381
Turbine Engine Parts	354	454	452	561	851
Piston Engine Parts	7	4	5	6	14
Spacecraft Parts, & Other Parts & Accessories	714	720	662	849	1,217
TOTAL MILITARY	$ 592	$ 692	$ 519	$1,139	$1,148
Complete Aircraft—TOTAL	$ 42	$ 28	$ 3	$ 14	$ 20
Aircraft Engines—TOTAL	8	16	4	124	217
Turbine Engines	8	16	3	123	215
Piston Engines Including Parts	(*a*)	(*a*)	1	1	2
Aircraft Engine Parts—TOTAL	542	648	512	1,001	911
Aircraft Parts	427	575	442	632	493
Turbine Engine Parts	50	47	52	163	228
Other Parts & Accessories	65	26	18	206	190

Source: Bureau of the Census, "U.S. Imports for Consumption and General Imports, TSUSA Commodity and Country of Origin," Report FT 246 (Annually).

NOTE: Detail may not add to totals because of rounding.

a Less than $500,000.

r Revised.

U.S. IMPORTS OF COMPLETE AIRCRAFT

Calendar Years 1981-1985

Aircraft Imports	1981	1982	1983	1984	1985
TOTAL NUMBER OF AIRCRAFT	882	872	693	995	1,241
Civil Aircraft—TOTAL	852	852	679	951	1,166
New Complete Aircraft:					
Helicopters	213	184	100	61	60
General Aviation:					
Single-Engine	9	23	6	21	46
Multi-Engine Under 4400 lbs	2	13	18	33	8
Multi-Engine 4400-10,000 lbs	123	87	52	58	46
Multi-Engine, Turbojet/Turbofan, 10,000-33,000 lbs				61	54
Multi-Engine, Other, including Turboshaft, 10,000-33,000 lbs	218	151	86	34	49
Transports (Multi-Engine, Over 33,000 lbs)	8	8	7	12	29
Other Civil Aircraft:					
Used or Rebuilt	160	186	181	223	246
Aircraft Previously Exported from U.S	NA	NA	NA	NA	NA
Gliders	119	200	229	448	628
Balloons & Airships	NA	NA	NA	NA	NA
Military Aircraft—TOTAL	30	20	14	44	75
New Complete Aircraft	25	17	7	43	66
Gliders	5	3	7	1	9
Balloons & Airships	NA	NA	NA	NA	NA

(Continued on next page)

U.S. IMPORTS OF COMPLETE AIRCRAFT
(Continued)

Aircraft Imports	1981	1982	1983	1984	1985
TOTAL VALUE OF AIRCRAFT (Millions of Dollars)	$1,599.7	$1,626.8	$926.8	$1,314.6	$1,522.0
Civil Aircraft—TOTAL	$1,558.1	$1,598.9	$923.8	$1,300.5	$1,501.6
New Complete Aircraft:					
Helicopters	105.4	84.9	89.5	51.3	44.7
General Aviation:					
Single-Engine	0.8	2.0	0.4	1.5	7.5
Multi-Engine Under 4400 lbs	0.1	1.7	2.5	4.2	1.5
Multi-Engine 4400-10,000 lbs	123.7	104.3	72.6	100.1	95.1
Multi-Engine, Turbojet/Turbofan, 10,000-33,000 lbs				343.8	313.1
Multi-Engine, Other, Including Turboshaft, 10,000-33,000 lbs	788.4	729.7	466.4	162.1	255.6
Transports (Multi-Engine, Over 33,000 lbs)	195.5	231.4	188.0	269.7	598.8
Other Civil Aircraft:					
Used or Rebuilt	122.3	112.0	72.8	351.8	176.6
Aircraft Previously Exported from U.S.	220.0	330.0	27.9	8.8	—
Gliders	1.6	2.6	3.5	3.6	3.8
Balloons & Airships	0.3	0.3	0.2	3.6	4.4
Military Aircraft—TOTAL	41.6	27.9	3.0	14.1	20.4
New Complete Aircraft	41.4	27.9	2.7	14.0	19.4
Gliders	(*a*)	(*a*)	0.2	(*a*)	0.2
Balloons & Airships	0.2	(*a*)	0.1	0.1	0.8

Source: Bureau of the Census, "U.S. Imports for Consumption and General Imports, TSUSA Commodity and Country of Origin," Report FT 246 (Annually).

NA Not available.

a Less than $50,000.

TOTAL U.S. EXPORTS AND EXPORTS OF AEROSPACE PRODUCTS

Calendar Years 1961-1985
(Millions of Dollars)

Year	TOTAL Exports[a] of U.S. Merchandise	Exports of Aerospace Products				
		TOTAL	Percent of Total U.S. Exports	Civil		Military
				Total	Transports	
1961	$ 20,754	$ 1,653	8.0%	$ 878	$ 263	$ 775
1962	20,431	1,923	9.4	910	259	1,013
1963	23,062	1,627	7.1	732	191	895
1964	26,156	1,608	6.1	764	211	844
1965	27,127	1,618	6.0	854	353	764
1966	29,884	1,673	5.0	1,035	421	638
1967	31,142	2,248	7.2	1,380	611	868
1968	34,199	2,994	8.8	2,289	1,200	705
1969	37,462	3,138	8.4	2,027	947	1,111
1970	42,590	3,405	8.0	2,516	1,283	889
1971	43,492	4,203	9.7	3,080	1,567	1,123
1972	48,959	3,795	7.8	2,954	1,119	841
1973	70,246	5,142	7.3	3,788	1,664	1,354
1974	97,144	7,095	7.3	5,273	2,655	1,822
1975	106,561	7,792	7.3	5,324	2,397	2,468
1976	113,666	7,843	6.9	5,677	2,468	2,166
1977	119,006	7,581	6.4	5,049	1,936	2,532
1978	141,228	10,001	7.1	6,018	2,558	3,983
1979	178,798	11,747	6.6	9,772	4,998	1,975
1980	216,672	15,506	7.2	13,248	6,727	2,258
1981	228,961	17,634	7.7	13,312	7,180	4,322
1982	207,158	15,603	7.5	9,608	3,834	5,995
1983	195,969	16,065	8.2	10,595	4,683	5,470
1984	212,057	15,008	7.1	9,659	3,195	5,350
1985	206,925	18,724	9.0	12,919	5,518	5,805

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity by Country," Report FT 446 (Annually); "Highlights of U.S. Export and Import Trade," Report FT 990 (Monthly).

NOTE: Detail may not add to totals because of rounding.

[a] Exports of domestic merchandise including DOD shipments.

U.S. EXPORTS OF AEROSPACE PRODUCTS

Calendar Years 1981-1985
(Millions of Dollars)

Aerospace Exports	1981	1982	1983	1984	1985
TOTAL	$17,634	$15,603	$16,065	$15,008	$18,724
TOTAL CIVIL	$13,312	$ 9,608	$10,595	$ 9,659	$12,919
Complete Aircraft—TOTAL	$ 8,613	$ 4,848	$ 5,691	$ 4,147	$ 6,694
Transports	7,180	3,834	4,683	3,195	5,518
General Aviation[a]	790	517	356	268	191
Helicopters	346	206	232	234	210
Other, Including Used	297	291	420	450	775
Aircraft Engines—TOTAL	784	763	950	1,057	923
Turbine Engines	739	721	914	1,021	880
Piston Engines	45	42	36	36	43
Aircraft and Engine Parts Incl. Spares—TOTAL	3,915	3,997	3,954	4,455	5,302
Aircraft Parts & Accessories	2,960	2,857	2,742	3,094	3,610
Aircraft Engine Parts	955	1,140	1,212	1,361	1,692
TOTAL MILITARY	$ 4,322	$ 5,995	$ 5,470	$ 5,350	$5,805
Complete Aircraft—TOTAL[b]	$ 1,712	$ 2,388	$ 1,845	$ 1,581	$ 2,011
Fighters & Fighter Bombers	1,006	1,473	1,379	977	1,352
Transports	158	341	112	85	101
Helicopters	177	156	62	83	117
Other, Including Used	371	418	292	436	441
Aircraft Engines—TOTAL	83	140	172	141	146
Turbine Engines	78	136	162	125	144
Piston Engines	5	4	10	16	2
Aircraft and Engine Parts Incl. Spares—TOTAL	1,971	2,341	2,459	2,666	2,823
Aircraft Parts & Accessories	1,475	1,845	2,058	2,241	2,302
Aircraft Engine Parts	496	496	401	425	521
Guided Missiles, Rockets, & Parts—TOTAL	556	1,126	994	962	825
Guided Missiles & Rockets	213	716	443	288	404
Missile & Rocket Parts	313	378	499	646	387
Missile & Rocket Engines	4	8	28	16	14
Missile & Rocket Engine Parts	26	24	24	12	20

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity by Country," Report FT 446 (Annually).

[a] All fixed-wing aircraft under 33,000 pounds.

[b] Includes aircraft exported under Military Assistance Programs and Foreign Military Sales.

U.S. EXPORTS OF CIVIL AIRCRAFT

Calendar Years 1981-1985

Civil Aircraft Exports	1981	1982	1983	1984	1985
TOTAL NUMBER OF AIRCRAFT	3,826	1,557	1,088	1,045	1,050
Helicopters—TOTAL	453	254	216	233	137
Under 2200 lbs	268	162	141	155	68
Over 2200 lbs	185	92	75	78	69
General Aviation—TOTAL	2,617	940	519	425	484
Single-Engine	1,800	539	279	271	334
Multi-Engine, Under 4400 lbs	371	167	106	53	66
Multi-Engine, 4400-10,000 lbs	426	209	112	83	65
Multi-Engine, 10,000-33,000 lbs	20	25	22	18	19
Transports—TOTAL	255	121	129	83	152
Passenger Aircraft, Over 33,000 lbs	236	110	122	77	140
Cargo Aircraft, Over 33,000 lbs	7	6	2	3	6
Other, Over 33,000 lbs, Incl. Pass./Cargo Combi	12	5	5	3	6
Other Aircraft—TOTAL	501	242	224	304	277
Used or Rebuilt Aircraft	501	242	224	304	277
Other Aircraft, Including Balloons, Gliders & Kites	NA	NA	NA	NA	NA
TOTAL VALUE (Millions of Dollars)	$8,613	$4,848	$5,691	$4,147	$6,694
Helicopters—TOTAL	$ 346	$ 206	$ 232	$ 234	$ 210
Under 2200 lbs	71	45	35	45	18
Over 2200 lbs	275	161	197	189	192
General Aviation—TOTAL	790	517	356	268	191
Single-Engine	105	36	23	34	48
Multi-Engine, Under 4400 lbs	72	35	21	13	14
Multi-Engine, 4400-10,000 lbs	526	309	155	99	85
Multi-Engine, 10,000-33,000 lbs	87	137	157	122	44
Transports—TOTAL	7,180	3,834	4,683	3,195	5,518
Passenger Aircraft, Over 33,000 lbs	6,087	3,310	4,415	2,998	4,643
Cargo Aircraft, Over 33,000 lbs	363	216	37	62	334
Other, Over 33,000 lbs, Incl. Pass./Cargo Combi	730	308	231	135	541
Other Aircraft—TOTAL	297	291	420	450	775
Used or Rebuilt	235	218	298	293	333
Other, Including Balloons, Gliders & Kites	62	73	122	157	442

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity by Country," Report FT446 (Annually).
NA Not available.

U.S. EXPORTS OF CIVIL HELICOPTERS

Calendar Years 1981-1985

Region of Destination	1981	1982	1983	1984	1985
TOTAL NUMBER EXPORTED	453	254	216	233	137
Canada & Greenland	78	17	16	8	12
Latin America & Caribbean	140	63	38	32	25
Europe	71	49	51	89	18
Middle East	21	13	48	12	6
Asia	70	38	44	62	51
Oceania	32	21	8	25	18
Africa	41	53	11	5	7
TOTAL VALUE (Millions of Dollars)	$346.4	$205.9	$232.1	$233.8	$209.8
Canada & Greenland	$ 40.6	$ 15.2	$ 9.7	$ 4.1	$ 5.0
Latin America & Caribbean	89.5	49.5	47.0	42.0	19.0
Europe	91.8	42.0	50.7	52.8	5.4
Middle East	27.2	12.9	48.6	16.3	24.5
Asia	65.3	50.4	59.2	107.5	141.1
Oceania	19.5	10.6	1.1	9.3	9.5
Africa	12.5	25.3	15.8	1.8	5.3

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity by Country," Report FT446 (Annually).

U.S. IMPORTS OF CIVIL HELICOPTERS

Calendar Years 1981-1985

Country of Origin	1981	1982	1983	1984	1985
TOTAL NUMBER IMPORTED	213	184	100	61	60
France	193	167	46	13	13
Germany	12	15	48	16	35
Italy	8	1	1	30	8
United Kingdom	—	1	5	2	4
TOTAL VALUE (Millions of Dollars)	$105.4	$ 84.9	$ 89.5	$51.3	$44.7
France	$ 92.4	$ 74.2	$ 39.6	$14.9	$13.7
Germany	6.9	8.9	35.8	9.7	19.9
Italy	6.1	1.1	0.8	19.2	3.9
United Kingdom	—	0.7	13.3	7.5	7.2

Source: Bureau of the Census, "U.S. Imports for Consumption and General Imports, TSUSA Commodity and Country of Origin," Report FT246 (Annually).

U.S. EXPORTS OF GENERAL AVIATION AIRCRAFT[a]

Calendar Years 1981-1985

Region of Destination	1981	1982	1983	1984	1985
TOTAL NUMBER EXPORTED	2,617	940	519	425	484
Canada & Greenland	336	94	43	49	44
Latin America & Caribbean	1,220	348	204	108	175
Europe	442	226	102	113	111
Middle East	23	32	13	10	33
Asia	57	40	30	47	55
Oceania	301	113	43	62	49
Africa	238	87	84	36	17
TOTAL VALUE (Millions of Dollars)	$ 789.5	$516.6	$356.0	$267.8	$191.1
Canada & Greenland	$ 57.7	$ 19.3	$ 13.6	$ 23.7	$ 15.1
Latin America & Caribbean	279.6	166.3	66.0	33.3	44.0
Europe	219.7	178.3	92.9	60.6	57.2
Middle East	30.2	18.6	86.2	62.2	3.9
Asia	39.1	25.3	31.4	48.1	40.4
Oceania	75.8	45.1	16.1	8.6	19.4
Africa	87.4	63.7	49.8	31.3	11.1

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity by Country," Report FT446 (Annually).

[a] All fixed-wing aircraft under 33,000 pounds.

U.S. IMPORTS OF GENERAL AVIATION AIRCRAFT

Calendar Years 1981-1985

Country of Origin	1981	1982	1983	1984	1985
TOTAL NUMBER IMPORTED	352	274	162	207	203
Brazil	37	24	15	14	10
Canada	51	58	38	27	26
France	59	48	19	30	49
Israel	42	22	9	24	9
Japan	70	52	17	15	8
Netherlands	1	—	—	3	6
United Kingdom	67	36	36	53	58
Other	25	34	28	41	37
TOTAL VALUE (Millions of Dollars)	$913.0	$837.7	$541.9	$611.7	$672.7
Brazil	$ 54.0	$ 40.2	$ 26.9	$ 23.9	$ 26.3
Canada	243.0	306.9	208.4	159.6	173.1
France	248.2	222.6	104.3	95.7	83.9
Israel	123.8	72.9	31.7	85.2	33.0
Japan	34.3	37.7	16.2	14.8	7.7
Netherlands	10.2	—	—	18.2	35.0
United Kingdom	183.7	143.9	137.0	198.1	200.7
Other	15.8	13.5	17.4	16.2	113.0

Source: Bureau of the Census, "U.S. Imports for Consumption and General Imports, TSUSA Commodity and Country of Origin," Report FT246 (Annually).

U.S. EXPORTS OF COMMERCIAL TRANSPORT AIRCRAFT

33,000 Pounds and Over Airframe Weight
Calendar Years 1981-1985

Region of Destination	1981	1982	1983	1984	1985
TOTAL NUMBER EXPORTED	255	121	129	83	152
Canada	25	13	8	6	4
Latin America & Caribbean	35	13	8	3	4
Europe	108	31	57	34	72
Middle East	21	13	10	9	8
Asia	34	25	30	23	49
Oceania	19	8	4	2	7
Africa	13	18	12	6	8
TOTAL VALUE (Millions of Dollars)	$7,180	$3,834	$4,683	$3,195	$5,518
Canada	$ 584	$ 294	$ 280	$ 265	$ 84
Latin America & Caribbean	1,027	301	304	69	234
Europe	2,528	938	1,785	1,008	2,050
Middle East	841	699	291	242	438
Asia	1,405	1,096	1,464	1,165	2,124
Oceania	559	234	180	137	437
Africa	236	272	379	309	151

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity by Country," Report FT446 (Annually).

U.S. EXPORTS OF MILITARY AIRCRAFT[a]

Calendar Years 1981-1985

	1981	1982	1983	1984	1985
TOTAL NUMBER OF AIRCRAFT	508	637	936	381	313
Fighters & Fighter Bombers	113	154	93	110	91
Transports	22	32	15	6	6
Helicopters	68	55	55	32	38
New Aircraft, NEC	156	228	124	227	141
Used or Rebuilt Aircraft	149	168	649	6	37
Airships, Balloons, Gliders, etc.	NA	NA	NA	NA	NA
TOTAL VALUE (Millions of Dollars)	$1,712	$2,388	$1,845	$1,581	$2,011
Fighters & Fighter Bombers	$1,006	$1,473	$1,378	$ 977	$1,352
Transports	158	341	112	85	101
Helicopters	177	156	62	83	117
New Aircraft, NEC	306	361	248	410	357
Used or Rebuilt Aircraft	15	16	22	6	59
Airships, Balloons, Gliders, etc.	50	41	23	20	25

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity by Country," Report FT446 (Annually).
NEC Not elsewhere classified.
NA Not available.
[a] Includes aircraft exported under Military Assistance Programs and Foreign Military Sales.

U.S. EXPORTS OF AIRCRAFT ENGINES

Calendar Years 1983-1985
(Millions of Dollars)

	1983		1984		1985	
	Number	Value	Number	Value	Number	Value
TOTAL	3,698	$1,122	3,815	$1,199	6,577	$1,069
Turbine Engines-New	1,104	$ 743	828	$ 706	1,942	$ 699
Civil	890	597	573	589	1,748	570
Military	214	146	255	117	194	129
Turbine Engines-Used	677	333	744	441	619	325
Civil	550	317	691	433	569	310
Military	127	16	53	8	50	15
Piston Engines	1,917	46	2,243	52	4,016	45
Civil, New, Under 500 HP	776	9	855	12	854	11
Civil, New, Over 500 HP	139	11	100	4	1,688	8
Civil, Used	863	16	1,198	20	1,402	24
Military	139	10	90	16	72	2

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity by Country," Report FT446 (Annually).

U.S. IMPORTS OF TURBINE AIRCRAFT ENGINES[a]

Calendar Years 1983-1985
(Millions of Dollars)

	1983		1984		1985	
	Number	Value	Number	Value	Number	Value
Turbine Engines	1,448	$605	2,185	$861	2,010	$1,226
Civil	1,343	602	1,832	738	1,760	1,011
Military	150	3	353	123	250	215

Source: Bureau of the Census, "U.S. Imports for Consumption and General Imports, TSUSA Commodity and Country of Origin," Report FT246 (Annually).

[a] New and used.

EXPORT-IMPORT BANK LENDING AUTHORITY AND GROSS AUTHORIZATIONS SUMMARY

Fiscal Years 1978-1987
(Millions of Dollars)

LOANS[a]

Year	Lending Authority[c]	Authorizations Summary				
		TOTAL Direct Loans[a]	Regular Loans			Discount Loans, Medium Term, and Small Business Credits
			Total Regular Loans[a]	Direct Credits	CFF[b] & Relending	
1978	$3,600	$3,425	$2,927	$2,872	$ 55	$ 497
1979	3,750	4,475	3,825	3,725	100	650
1980	4,001	4,578	4,087	4,045	42	491
1981	5,461	5,431	5,079	5,045	34	352
1982	4,400	3,516	3,104	3,104	(*b*)	412
1983	4,400	845	685	685	(*b*)	160
1984	3,865	1,465	1,122	1,122	(*b*)	343
1985	3,865	659	320	320	(*b*)	339
1986[E]	1,062	NA	NA	NA	(*b*)	NA
1987[E]	—	NA	NA	NA	(*b*)	NA

GUARANTEES AND INSURANCE

Year	Lending Authority	Authorizations Summary		
		TOTAL Guarantees and Insurance	Guarantees	Insurance
1978	$ (*d*)	$3,951	$ 589	$3,362
1979	(*d*)	5,016	908	4,108
1980	(*d*)	8,032	2,510	5,522
1981	8,059	7,416	1,506	5,910
1982	9,220	5,832	727	5,105
1983	9,000	8,525	1,741	6,784
1984	10,000	7,151	1,333	5,818
1985	10,000	7,850	1,320	6,530
1986[E]	11,484[f]	NA	NA	NA
1987[E]	12,000[f]	NA	NA	NA

Source: Export-Import Bank of the United States.

NOTE: Detail may not add to totals because of rounding.

a Discount Loans excluded from loan lending authority limitation until FY 1981. Comparable authorization data for 1980 and prior years are therefore listed under Total Regular Loans, which include Direct Credits, CFF and Relending Loans. For 1981 and subsequent years, compare TOTAL Direct Loans authorization data with Lending Authority, both of which include Discount Loans. The value of Loans may exceed Lending Authority because of the inclusion in Loans of the full amount of Certificates of Loan Participation (COLPs), portions of which are subsequently sold to commercial banks.

b CFF (Cooperative Financing Facility) program discontinued after 1981.

c Effective 1981, lending authority includes discount loans as well as direct loans.

d Limitation for Guarantees and Insurance began in 1981.

E Estimate. Latest year represents Administration's budget proposal

f Includes $1,800 million proposed I-MATCH Program, which would replace direct lending and would allow an estimated $100 million in commercial loan interest buy-down.

NA Not available.

EXPORT-IMPORT BANK TOTAL AUTHORIZATIONS OF LOANS AND GUARANTEES AND AUTHORIZATIONS IN SUPPORT OF AIRCRAFT EXPORTS[r]

Fiscal Years 1975-1985
(Millions of Dollars)

Year	TOTAL AUTHORIZATIONS	Authorizations in Support of Aircraft Exports			
		TOTAL	Percent of TOTAL Authorizations	Commercial Jet Aircraft[a]	Other Aircraft[b]
LOANS[c]					
1975	$3,813	$ 795.6	20.9%	$ 691.2	$104.4
1976	3,489	475.5	13.6	398.4	77.1
Tr. Qtr.	448	98.3	21.9	93.8	4.5
1977	1,221	156.1	12.8	137.6	18.5
1978	3,425	237.8	6.9	189.5	48.3
1979	4,475	1,469.4	32.8	1,399.4	70.0
1980	4,578	1,743.3	38.1	1,692.6	50.7
1981	5,431	2,576.6	47.4	2,550.3	26.3
1982	3,516	263.9	7.5	199.1	64.8
1983	845	396.7	46.9	383.8	12.9
1984	1,465	608.0	41.5	531.8	76.2
1985	659	39.7	6.0	15.2	24.5
GUARANTEES[d]					
1975	$1,574	$ 84.5	5.4%	$ 64.0	$ 20.5
1976	1,661	107.6	6.5	87.2	20.4
Tr. Qtr.	272	62.6	23.0	58.7	3.9
1977	1,021	307.5	30.1	293.9	13.6
1978	589	97.6	16.6	77.2	20.4
1979	908	261.4	28.8	239.3	22.1
1980	2,510	1,131.9	45.1	1,088.1	43.8
1981	1,506	562.6	37.4	533.4	29.2
1982	727	104.2	14.3	78.4	25.8
1983	1,741	629.6	36.2	601.3	28.3
1984	1,333	355.5	26.7	293.5	62.0
1985	1,320	322.4	24.4	290.0	32.4

Source: Export-Import Bank of the United States.

[a] Includes complete aircraft, related engines and parts, and retrofits.

[b] Includes business aircraft, general aviation aircraft, helicopters, and related goods and services. Data revised to include Discount Loans.

[c] Loans are commitments for financing by the Export-Import Bank to foreign buyers of U.S. equipment and services, including Direct Credits, loans authorized under the Cooperative Financing Facility (CFF), (until the termination of the CFF program in 1981), and Discount Loans, which are made by the Export-Import Bank to commercial banks and which subsequently may be guaranteed by the Export-Import Bank, in which case the value of the loans is also included with Guarantees.

[d] Guarantees by the Export-Import Bank provide assurances of repayment of principal and interest on loans made by private lending institutions, such as commercial banks, for major export transactions. Excludes insurance.

[r] Revised to include Discount Loans and corrected data.

EXPORT-IMPORT BANK
SUMMARY OF COMMERCIAL JET AIRCRAFT AUTHORIZATIONS FOR LOANS[a] AND GUARANTEES[b]

Fiscal Years 1957-1985
(Values in Millions of Dollars)

Year	No. of Jet Aircraft[c]		Export Value[c]		No. of New Commitments		Gross Authorizations	
	Loans	Guarantees	Loans	Guarantees	Loans	Guarantees	Loans	Guarantees
New Authorizations:								
1957[d]-1968	322	53	$ 2,572	$ 331	92	58	$ 1,520	$ 274
1969	55	23	451	207	23	18	197	111
1970	142	1	1,749	3	44	38	598	79
1971	126	9	1,539	40	58	49	481	363
1972	145	2	1,334	9	44	29	475	183
1973	129	4	1,729	25	60	23	690	191
1974	189	—	2,195	—	79	22	895	133
1975	136	1	2,070	5	64	10	691	64
1976	77	6	1,017	139	34	11	398	87
Tr. Qtr.	15	5	219	182	6	3	94	59
1977	31	25	330	902	16	14	138	294
1978	29	5	479	253	18	5	189	77
1979	118	7	2,938	317	35	10	1,399	239
1980	136	21	3,975	901	36	24	1,693	1,088
1981	121	18	4,568	637	26	17	2,550	533
1982	11	6	441	113	5	2	199	78
1983	21	9	779	619	3	4	384	601
1984	37	8	1,023	327	7	4	532	294
1985	—	14	19	481	1	5	13	289
Cumulative New Authorizations[r]	1,840	217	29,425	5,492	651	346	13,136	5,037
Transfers, Reversals, & Participation	—	—	(8)	8	4	—	(140)	(20)
Cumulative Gross Authorizations (net of Adjustments)[r]	1,840	217	29,417	5,500	655	346	12,996	5,017

Source: Export-Import Bank of the United States.

NOTE: Detail may not add to totals because of rounding.

[a] Loans are commitments for direct financing by the Export-Import Bank to foreign buyers of U.S. equipment and services, including Direct Credits and loans authorized under the Cooperative Financing Facility (CFF) until the termination of the CFF program in 1981, but excluding Discount Loans, which are made by the Export-Import Bank to commercial banks and which subsequently may be guaranteed by the Export-Import Bank, in which case the value of the loans is included with Guarantees.

[b] Guarantees by the Export-Import Bank provide assurances of repayment of principal and interest on loans made by private lending institutions, such as commercial banks, for major export transactions.

[c] For Export-Import Bank commitments including both loan and guarantee authorization, number of aircraft and export value reported under "Loans."

[d] First year of commercial jet aircraft authorizations.

[r] Revised.

EXPORT-IMPORT BANK AUTHORIZATIONS OF LOANS AND GUARANTEES IN SUPPORT OF EXPORTS OF COMMERCIAL JET AIRCRAFT

Fiscal Years 1983-1985
(Values in Millions of Dollars)

Customer (Country/Airline)	Number and Aircraft Model or Related Product	Export Value	Authorization				
			Loans (Direct Credits)				Guarantees
			Amount	Percent Coverage[a]	Interest Rate	Repayment Terms[b]	Amount
FY 1985							
TOTALS	14 aircraft	$ 500.7	$ 12.6	—	—	—	$288.9
Morocco/Royal Air Maroc	—	—	—	—	—	—	(1.1) (g)
Japan/All Nippon Airways	8 X 767	297.8	—	—	—	—	134.0
	engines	19.4	12.6	65.0	12.00	20-S	—
Yugoslavia/Jugoslovenski Aerotransport	2 X 737	60.8	—	—	—	—	51.7
Yugoslavia/Inex Adria Aviopromet	1 X DC-9	22.4	—	—	—	—	19.0
Brazil/Viacao Aerea Sao Paulo	engines	25.1	—	—	—	—	21.4
Mexico/Aironaves De Mexico	3 X DC-9	75.2	—	—	—	—	63.9
FY 1984							
TOTALS	45 aircraft	$1,350.3	$531.8	—	—	—	$293.5
Angola/Banco Nacional	1 X 737-200	$ 18.5	$ —	—%	—%	—	$ 12.0
Canada/Canadian Pacific	5 X 737-300	129.1	80.7	62.5	12.00	15-S	—
Denmark/Maersk Air	2 X 737-300	52.3	32.7	62.5	12.00	15-S	—
Egypt/Egyptair	3 X 767-200	173.0	147.0	85.0	12.00 12.50	20-S	—
Ethiopia/Ethiopian Airlines	2 X 767-200	113.1	—[f]	—	—	—	48.0
Finland/Finnair	1 X MD-80	26.5	14.0	52.7	12.00	20-S	—
Italy/Alitalia	16 X MD-80	412.9	145.5	35.2	12.00	10-S	145.5
Japan/All Nippon Airways	5 X 767-200	195.5	—	—	—	—	88.0
Jordan/Alia	4 X L-1011-500	72.0	45.0	62.5	12.00	15-S	—
Pakistan/Pakistan Int'l	6 X 737-300	157.4	66.9	42.5	12.00	10-S	—

(Continued on next page)

EXPORT-IMPORT BANK
LOAN AND GUARANTEE AUTHORIZATIONS (Continued)

Customer (Country/Airline)	Number and Aircraft Model or Related Product	Export Value	Authorization				
			Loans (Direct Credits)				Guarantees
			Amount	Percent Coverage[a]	Interest Rate	Repayment Terms[b]	Amount
FY 1983							
TOTALS	30 aircraft	$1,398.8	$383.7	—	—	—	$601.3
Algeria/Air Algerie	3 X 737	$ 58.0	$ —	—%	—%	—	$ 49.3
Finland/Finnair	3 X MD-80	57.4	35.8	62.5	12.00	20-S	—
Italy/Alitalia	14 X MD-80	358.0	75.0	21.0	12.00	7-S	150.0
Singapore/Singapore Airlines	6 X 747-300[c]	558.3[c]	—	—	—	—	362.9[c]
(3 parts of one commitment)	Spare P & W engines[c]	179.9[c]	134.9[c]	75.0	12.00	18-S	18.0[c]
	4X 757	184.0	138.0	75.0	10.00	20-S	18.4
Yugoslavia	2 X 727 mods.[d]	3.2[d]	—	—	—	—	2.7

Source: Aerospace Industries Association, based on data from the Export-Import Bank of the United States.

NOTE: For definitions of Loans and Guarantees, see Export-Import Bank tables on previous pages.

[a] Amount of loan as percent of export value.

[b] Number of payments and frequency (S - semi-annual)

[c] Loan and guarantee authorization for 747s and P&W engines for Singapore Airlines approved in FY1983 and included in FY1983 gross authorizations TOTALS; subsequently not accepted by customer, and cancelled in FY1984.

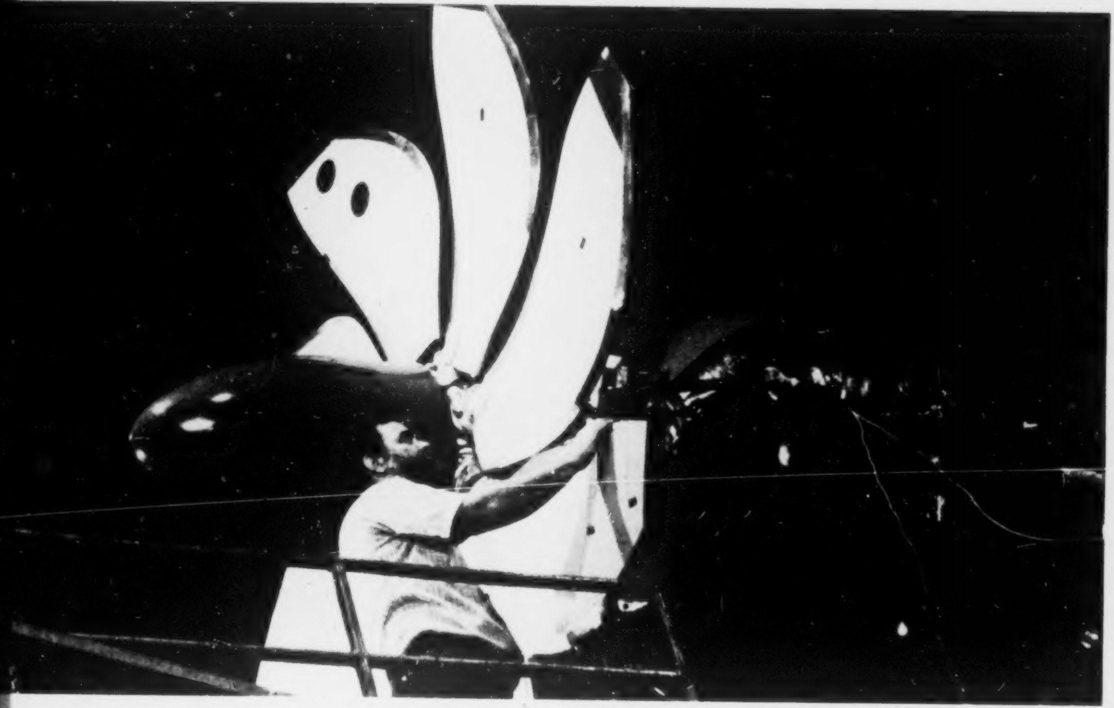
[d] Export value of additional equipment and parts for aircraft modifications.

[e] Loan reduced in FY1983 to $40.7 million for 2 aircraft with export value of $75.8 million.

[f] Reflects higher selling cost than earlier estimated.

[g] Reflects change from Exim guaranteed financing to non guaranteed financing.

[i] Increased financing for previous authorization; FY TOTALS include increase in authorization amount and any additional export value, but exclude number of aircraft and original export value, which were counted in year of original authorization.



The aerospace industry's average employment during 1985 was 1,308,000, more than nine percent above the 1984 average and the highest level since 1969. The aerospace labor force represented 6.7 percent of the total employment in all U.S. manufacturing industries, up from the previous year's 6.2 percent, and 11.3 percent of the total employment of U.S. companies producing durable goods; the latter figure compares with 10.4 percent in 1984.

Gains were reported in all major employment categories but the overall increase was primarily attributable to a substantial rise in the segment of the industry manufacturing aircraft, engines and parts. In that category, employment increased by 51,000 to 647,000, almost half of the industry's total work force. Among companies fabricating missiles and space vehicles, employment climbed by 22,000 to 177,000, and in the avionics category there was a gain of 13,000 to 181,000. In the catchall category that embraces all other aerospace products and services, employment increased 25,000 to a 1985 average of 303,000.

The number of production workers in the aerospace industry increased from 538,000 in 1984 to 584,000 in 1985. The gains extended across the board: 22,000 in the aircraft, engines and parts category to a total of 308,000; 10,000 in missiles/space (total 62,000); 3,000 in avionics (total 78,000); and 11,000 in the "other" category (total 136,000).

Aerospace employment at yearend 1985 reached 1,335,000, compared with 1,250,000 at the start of the year. Aerospace Industries Association projected a further rise to 1,370,000 by the end of 1986, due to continuing high levels of government work and further growth of employment in the commercial aircraft manufacturing segment of the industry.

On the basis of the yearend 1985 employment figure (rather than the earlier cited annual average), the number of production workers in the industry (597,000) amounted to almost 45 percent of the total work force; that compares with an average for the five prior years of the 1980s of approximately 47 percent. Numbering 240,000, scientists and engineers constituted just under 18 percent of

Employment

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total aerospace employment, compared with the five prior year average of 17.0 percent. The 99,000 aerospace technicians in the labor force represented almost 7.5 percent of the total, compared with 7.0 percent for the earlier years of the 1980s. The projected breakdown of the 1,370,000 employees expected to be on rolls at the end of 1986 is production workers 610,000; scientists and engineers 248,000; technicians 101,000; all others 411,000.

The aerospace industry's annual payroll for 1985 totaled $46.0 billion, up from $38.7 billion in the previous year. The 1985 figure represented more than 10 percent of the total payroll of all U.S. manufacturing companies. With lump-sum payments to employes included, the 1985 aerospace payroll came to $46.3 billion; such payments are made by many aerospace firms in lieu of general wage increases or cost of living adjustments.

Average weekly earnings for aerospace production workers—again including lump sum payments—were $532.77 in 1985. This represented an increase of 3.1 percent over the 1984 weekly average of $516.58. The average work week for production personnel was 42.2 hours, up from 41.9 hours in 1984.

As is customary, the Pacific region dominated in a geographic breakdown of 1985 aerospace employment with 41.9 percent of the total. Next, in order, were the Middle Atlantic region (15.1 percent), New England (11.5 percent), West North Central (9.0 percent), South Atlantic (8.7 percent), South Central (6.4 percent), East North Central (4.0 percent) and the Mountain region (3.4 percent). □

ANNUAL AVERAGE EMPLOYMENT IN ALL MANUFACTURING, DURABLE GOODS AND AEROSPACE INDUSTRIES

Calendar Years 1961-1985
(Thousands of Employees)

Year	All Manufacturing Industries	Durable Goods Industries	Aerospace Industry		
			TOTAL	As Percent of	
				All Manufacturing	Durable Goods
1961	16,326	9,070	1,178	7.2%	13.0%
1962	16,853	9,480	1,270	7.5	13.4
1963	16,995	9,616	1,267	7.5	13.2
1964	17,274	9,816	1,209	7.0	12.3
1965	18,062	10,405	1,175	6.5	11.3
1966	19,214	11,282	1,375	7.2	12.2
1967	19,447	11,439	1,484	7.6	13.0
1968	19,781	11,626	1,502	7.6	12.9
1969	20,167	11,895	1,402	7.0	11.8
1970	19,367	11,208	1,166	6.0	10.4
1971	18,623	10,636	951	5.1	8.9
1972	19,151	11,049	912	4.8	8.3
1973	20,154	11,891	956	4.7	8.0
1974	20,077	11,925	982	4.9	8.2
1975	18,323	10,688	941	5.1	8.8
1976	18,997	11,077	896	4.7	8.1
1977	19,682	11,597	893	4.5	7.7
1978	20,505	12,274	977	4.8	8.0
1979	21,040	12,760	1,109	5.3	8.7
1980	20,285	12,187	1,185	5.8	9.7
1981	20,170	12,109	1,201	6.0	9.9
1982	18,781	11,039	1,158	6.2	10.5
1983[r]	18,434	10,732	1,139	6.2	10.6
1984[r]	19,412	11,522	1,197	6.2	10.4
1985	19,426	11,566	1,308	6.7	11.3

Source: Manufacturing and Durable Goods Employment from Bureau of Labor Statistics, "Employment and Earnings" (Monthly); Aerospace Employment from Aerospace Industries Association estimates based on "Employment and Earnings," Bureau of Labor Statistics.

NOTE: For explanation of "Aerospace Employment," see the Glossary.

[r] Revised.

ANNUAL PAYROLL
AEROSPACE INDUSTRY AND ALL MANUFACTURING INDUSTRIES

Calendar Years 1966-1985
(Millions of Dollars)

Year	All Manufacturing Industries[b]	Aerospace[a]			Aerospace As Percent of All Manufacturing
		TOTAL	Production Workers	Other	
1966	$128,000	$12,139	$ 5,641	$ 6,498	9.5%
1967	134,100	13,727	6,382	7,345	10.2
1968	145,800	14,397	6,582	7,815	9.9
1969	157,500	14,649	6,401	8,248	9.3
1970	158,200	12,275	5,322	6,953	7.8
1971	160,300	10,480	4,409	6,071	6.5
1972	175,400	10,504	4,280	6,224	6.0
1973	196,200	12,107	5,087	7,020	6.2
1974	211,400	13,535	5,672	7,863	6.4
1975	211,000	14,608	5,935	8,673	6.9
1976	237,400	14,881	5,951	8,930	6.3
1977	266,000	16,276	6,464	9,812	6.1
1978	299,200	19,501	7,873	11,628	6.5
1979	333,900	24,243	10,247	13,996	7.3
1980	354,600	28,738	12,087	16,651	8.1
1981	365,300	31,937	13,018	18,919	8.3
1982	382,900	33,747	13,036	20,711	8.8
1983	395,200	34,031	13,094	20,937	8.6
1984	438,900	38,741	14,367	24,374	8.8
1985	457,600	45,997	16,059	29,938	10.1

AEROSPACE—INCLUDING LUMP-SUM PAYMENTS[c]

Year	TOTAL	Production Workers	Other	Aerospace As Percent of All Manufacturing
1984	$38,982	$14,452	$24,530	8.9%
1985	46,335	16,179	30,156	10.1

Source: Manufacturing Payroll from Bureau of Economic Analysis, "Survey of Current Business;" Aerospace Payroll from Aerospace Industries Association estimates.

[a] Based on AIA estimates of annual average employment and earnings for the aerospace industry; derived from BLS data (see Glossary, "Aerospace Employment" and "Aerospace Payroll").

[b] See Glossary, "Payroll, All Manufacturing."

[c] Many aerospace manufacturers have included lump-sum payments in labor settlements since late 1983 in lieu of general wage increases and/or cost of living adjustments. These payments are included in a separate wage series for SIC 3721 (Airframes) by the Bureau of Labor Statistics and are included in the totals for production workers and all aerospace by AIA.

EMPLOYMENT IN THE AEROSPACE INDUSTRY[a]

Calendar Years 1968-1985
(Annual Average, Thousands of Employees)

Year	TOTAL	Aircraft, Engines, & Parts (SIC 372)	Missiles & Space Vehicles (SIC 376)	Avionics[b]	Other
TOTAL EMPLOYMENT					
1968[c]	1,502	852	150	184	316
1969	1,402	804	124	179	295
1970	1,166	669	98	152	247
1971	951	531	88	129	203
1972	912	495	93	113	211
1973	956	525	93	116	222
1974	982	539	94	121	228
1975	941	514	93	116	218
1976	896	487	86	115	208
1977	893	482	83	121	207
1978	977	527	93	129	228
1979	1,109	611	102	139	257
1980	1,185	652	111	147	275
1981	1,201	646	123	154	278
1982	1,158	601	131	157	269
1983	1,139	579	140	156	264
1984[r]	1,197	596	155	168	278
1985	1,308	647	177	181	303
PRODUCTION WORKERS					
1968[c]	807	506	52	80	169
1969	746	464	41	86	155
1970	604	369	31	77	127
1971	480	285	26	66	103
1972	455	266	28	55	106
1973	482	284	29	57	112
1974	494	292	29	59	114
1975	461	271	29	54	107
1976	433	251	28	54	100
1977	429	247	26	56	100
1978	476	275	29	61	111
1979	562	332	33	67	130
1980	598	355	35	70	137
1981	590	343	37	74	136
1982	544	305	40	72	127
1983	518	282	45	70	121
1984[r]	538	286	52	75	125
1985	584	308	62	78	136

Source: Aerospace Industries Association, derived from "Employment and Earnings" (Monthly), Bureau of Labor Statistics.

[a] See Glossary for detailed explanation of "Aerospace Employment."

[b] Communications, navigation, flight control, and displays (aerospace-related portions of SICs 3662, 381, & 382).

[c] Aerospace industry employment peak.

[r] Revised.

EMPLOYMENT IN THE AIRCRAFT, ENGINES, AND PARTS INDUSTRY[a]

Calendar Years 1968-1985
(Annual Average, Thousands of Employees)

Year	TOTAL (SIC 372)	Airframes (SIC 3721)	Engines and Parts (SIC 3724)	Other Parts & Equipment (SIC 3728)
TOTAL EMPLOYMENT				
1968[b]	852.0	468.2	216.4	147.8
1969	804.4	456.7	205.0	142.7
1970	668.7	369.6	179.9	119.2
1971	530.8	287.7	150.6	92.6
1972	494.9	287.2	124.0	83.6
1973	524.9	300.5	132.6	91.8
1974	539.4	307.6	134.6	97.1
1975	514.0	292.8	126.3	94.9
1976	487.1	281.1	119.7	86.3
1977	481.7	270.4	120.9	90.4
1978	527.2	288.3	133.5	105.5
1979	610.8	333.2	151.6	126.1
1980	652.3	349.3	162.9	140.1
1981	645.5	344.2	162.5	138.8
1982	601.1	319.9	148.8	132.3
1983[r]	578.3	304.7	140.1	133.6
1984[r]	595.9	308.2	140.5	147.2
1985	646.9	337.7	148.7	160.5
PRODUCTION WORKERS				
1968[b]	505.5	280.9	123.9	100.7
1969	464.0	255.1	114.1	94.8
1970	369.3	197.0	95.0	77.3
1971	284.5	147.1	79.0	58.4
1972	266.2	145.1	68.6	52.5
1973	284.2	151.5	74.2	58.5
1974	291.9	154.4	75.2	62.3
1975	271.1	140.9	70.5	59.7
1976	250.7	132.2	65.6	53.0
1977	246.8	124.4	66.6	55.8
1978	275.4	133.9	75.3	66.2
1979	332.1	165.9	86.4	79.8
1980	354.6	173.7	93.0	88.0
1981	343.0	167.0	92.4	83.6
1982	305.4	144.7	84.2	76.6
1983[r]	282.5	131.5	74.7	76.3
1984[r]	286.1	129.1	73.2	83.9
1985	308.3	140.5	75.4	92.4

Source: Bureau of Labor Statistics, "Employment and Earnings" (Monthly).
NOTE: Detail may not add to totals because of rounding.
[a] See Glossary for detailed explanation of "Aerospace Employment."
[b] Aerospace industry employment peak.
[r] Revised.

AEROSPACE INDUSTRY EMPLOYMENT BY OCCUPATIONAL CLASSIFICATION

As of December 1968-1986
(Thousands of Employees)

Year	TOTAL[a]	Production Workers	Scientists & Engineers	Technicians	Others
1968	1,403	738	221	81	363
1969	1,295	658	203	72	362
1970	1,069	528	167	67	307
1971	924	448	159	60	257
1972	944	473	168	65	238
1973	962	484	164	66	248
1974	973	483	166	67	257
1975	925	444	167	63	251
1976	898	420	166	62	250
1977[b]	894	410	173	59	252
1978	1,032	519	170	64	279
1979	1,152	592	177	69	314
1980	1,218	612	196	78	332
1981	1,203	578	194	84	347
1982	1,153	535	200	79	339
1983[b]	1,171	528	207	87	349
1984[r]	1,250	562	223	93	372
1985[p]	1,335	597	240	99	399
1986[E]	1,370	610	248	101	411

Source: Aerospace Industries Association, based on company reports and data from the Bureau of Labor Statistics.

[a] End-of-year totals differ from annual averages appearing in other tables.

[b] Industry strike during this period.

[E] Estimate.

[p] Preliminary.

[r] Revised.

AEROSPACE INDUSTRY EMPLOYMENT BY OCCUPATIONAL CLASSIFICATION AND PRODUCT GROUP

As of December 1977-1986
(Thousands of Employees)

Year	TOTAL[a]	Production Workers	Scientists & Engineers	Technicians	All Others
AIRCRAFT AND PARTS					
1977[b]	482	263	78	23	118
1978	555	330	71	26	128
1979	654	397	76	28	153
1980	691	414	83	35	159
1981	641	377	77	38	149
1982	596	335	79	29	153
1983[b]	582	312	81	29	160
1984[r]	616	340	85	30	161
1985[p]	655	363	90	32	170
1986[E]	667	369	92	32	174
MISSILES AND SPACE VEHICLES AND PARTS					
1977[b]	191	65	61	14	61
1978	214	79	51	15	69
1979	220	82	51	15	72
1980	233	84	56	16	77
1981	262	96	59	19	88
1982	238	88	55	19	76
1983[b]	283	106	64	25	88
1984[r]	294	105	66	27	96
1985[p]	307	108	70	27	102
1986[E]	313	110	72	27	104
OTHER RELATED PRODUCTS AND SERVICES					
1977[b]	221	82	44	22	73
1978	263	110	48	23	82
1979	278	113	50	26	89
1980	294	114	57	27	96
1981	300	105	58	27	110
1982	319	112	66	31	110
1983[b]	306	110	62	33	101
1984[r]	340	117	72	36	115
1985[p]	373	126	80	40	127
1986[E]	390	131	85	41	133

Source: Aerospace Industries Association, based on company reports and data from the Bureau of Labor Statistics.

[a] End-of-year totals differ from annual averages appearing in other tables. Product group totals are based on AIA surveys, and include some component-related employment which is reported under separate SIC codes in BLS data.

[b] Industry strike during this period.

[E] Estimate.

[p] Preliminary.

[r] Revised.

GEOGRAPHIC DISTRIBUTION OF AEROSPACE EMPLOYMENT[a] BY OCCUPATIONAL CLASSIFICATION AND PRODUCT GROUP

As of December 1985

OCCUPATIONAL CLASSIFICATION

Region	TOTAL	Production Workers	Scientists & Engineers	Technicians	All Others
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%
New England	11.5%	14.5%	8.5%	9.7%	10.4%
Middle Atlantic	15.1	14.3	15.2	12.1	16.7
East North Central	4.0	5.1	3.4	4.1	3.3
West North Central	9.0	9.8	9.0	8.8	8.1
South Atlantic	8.7	7.7	7.3	8.8	10.5
South Central	6.4	7.3	5.5	3.6	6.7
Mountain	3.4	3.3	2.9	5.1	3.5
Pacific	41.9	38.0	48.2	47.8	40.8

PRODUCT GROUP

Region	Aircraft		Missiles	Space	Other	
	Civil	Military			Aerospace	Non-Aerospace
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100%
New England	14.9%	11.0%	20.7%	14.6%	15.9%	8.6%
Middle Atlantic	24.7	15.1	5.1		10.8	17.4
East North Central	4.0	6.8	0.3	0.7	5.5	5.5
West North Central	6.0	13.4	8.3		10.5	
South Atlantic	3.1	9.0	10.7	11.4	11.5	5.5
South Central	4.4	13.3	2.3	2.5	4.2	1.5
Mountain	3.7	31.4	7.4	5.1	41.6	61.5
Pacific	39.2		45.2	65.7		

Source: Aerospace Industries Association, company reports.

NOTE: Data for two regions are combined where employment for one region within a product group represented three or fewer companies.

[a] Employment in 40 surveyed aerospace manufacturing companies representing approximately two-thirds of total industry employment.

TOTAL EMPLOYMENT AND SCIENTISTS & ENGINEERS IN COMMERCIAL TRANSPORT AIRCRAFT & HELICOPTER MANUFACTURING ESTABLISHMENTS

As of December 1968-1986

Year	Commercial Transport Aircraft		Helicopters	
	Total	Scientists & Engineers	Total	Scientists & Engineers
1968	126,200	14,500	39,000	4,000
1969	114,200	15,800	30,600	3,200
1970	82,500	12,300	26,000	2,700
1971	72,000	9,400	21,700	3,000
1972	77,300	9,500	20,700	3,300
1973	75,700	9,300	22,100	3,100
1974	63,600	8,100	24,600	3,300
1975	51,100	7,400	25,800	3,100
1976	44,700	6,700	23,200	2,900
1977[a]	55,900	8,100	22,300	3,700
1978	70,100	10,400	26,600	3,600
1979	100,000	12,900	27,500	3,000
1980	106,500	13,700	29,800	3,200
1981	84,000	12,000	28,000	3,000
1982	69,800	11,100	28,300	3,200
1983[a]	48,200	8,400	27,600	3,500
1984[r]	57,600	9,300	31,300	3,800
1985[p]	61,900	9,800	33,600	4,300
1986[E]	61,900	10,100	35,400	4,500

Source: Aerospace Industries Association, company reports.

NOTE: Includes only establishments identified as prime manufacturers of commercial transport aircraft and of civil and military helicopters. Excludes subcontractors and propulsion manufacturers.

E Estimate.
a Industry strike during this period.
r Revised.
p Preliminary.

AVERAGE HOURLY EARNINGS IN THE AEROSPACE INDUSTRY

Production Workers Only
Calendar Years 1972-1985

Year	TOTAL[a]	Aircraft (SIC 372)				Guided Missiles, Space Vehicles & Parts (SIC 376)
		TOTAL	Airframes (SIC 3721)	Engines & Parts (SIC 3724)	Other Parts & Equipment (SIC 3728)	
AVERAGE HOURLY EARNINGS[b]						
1972	$ 4.63	$ 4.62	$ 4.65	$ 4.72	$ 4.42	$ 4.75
1973	4.99	4.99	5.09	5.04	4.70	5.02
1974	5.43	5.42	5.58	5.41	5.05	5.48
1975	6.00	6.00	6.21	6.04	5.47	6.02
1976	6.44	6.44	6.63	6.46	5.95	6.48
1977	6.93	6.92	7.07	7.05	6.44	7.04
1978	7.54	7.54	7.70	7.80	6.93	7.56
1979	8.26	8.26	8.50	8.53	7.48	8.25
1980	9.27	9.28	9.66	9.42	8.40	9.22
1981	10.29	10.31	10.74	10.41	9.35	10.06
1982	11.20	11.23	11.85	11.16	10.18[r]	10.96[r]
1983	11.79	11.82	12.58	11.61	10.73	11.61
1984	12.25	12.32	12.91	12.40	11.37	11.88
1985	12.53	12.62	13.18	12.85	11.63	12.06
AVERAGE HOURLY EARNINGS INCLUDING LUMP-SUM WAGE PAYMENTS[c]						
1984	$12.32	$12.42	$13.11	$12.40	$11.37	$11.88
1985	12.62	12.73	13.40	12.85	11.63	12.06

Source: Aerospace Industries Association, derived from "Employment and Earnings" (Monthly), Bureau of Labor Statistics.

[a] TOTAL column is a weighted average based on BLS employment data.

[b] Includes overtime premiums.

[c] *Many aerospace manufacturers have included lump-sum payments in labor settlements since late 1983 in lieu of general wage increases and/or cost of living adjustments. These payments are included in SIC 3721 as well as the totals for SIC 372 and for all aerospace.*

AVERAGE WEEKLY EARNINGS IN THE AEROSPACE INDUSTRY

Production Workers Only
Calendar Years 1972-1985*

Year	TOTAL[a]	Aircraft (SIC 372)				Guided Missiles, Space Vehicles & Parts (SIC 376)
		TOTAL	Airframes (SIC 3721)	Engines & Parts (SIC 3724)	Other Parts & Equipment (SIC 3728)	
AVERAGE WEEKLY EARNINGS[b]						
1972	$186.62	$185.26	$180.89	$193.52	$186.52	$199.50
1973	202.95	202.10	199.53	209.66	199.75	211.34
1974	221.10	220.59	222.08	221.81	213.62	226.32
1975	247.53	247.80	255.85	247.04	228.65	245.01
1976	263.31	263.40	273.16	259.69	245.74	262.44
1977	289.76	289.95	296.23	291.87	273.70	287.94
1978	318.05	318.19	324.17	325.26	298.68	316.76
1979	350.64	351.05	359.55	360.82	322.39	346.50
1980	388.71	389.76	403.79	393.76	357.84	378.02
1981	424.31	425.80	443.56	421.61	396.44	410.45
1982	459.99[r]	461.55	484.67	454.21	426.54[r]	448.26[r]
1983	486.10	486.98	526.73	476.01	452.81	480.65
1984	513.55	516.21	531.89	523.28	485.50	498.96
1985	528.82	532.56	546.97	542.27	504.74	510.14
AVERAGE WEEKLY EARNINGS INCLUDING LUMP-SUM PAYMENTS[c]						
1984	$516.58	$519.79	$540.13	$523.28	$485.50	$498.96
1985	532.77	537.30	556.10	542.27	504.74	510.14

Source: Aerospace Industries Association, derived from "Employment and Earnings" (Monthly), Bureau of Labor Statistics.

[a] TOTAL column is a weighted average based on BLS employment data.

[b] Includes overtime premiums.

[c] Many aerospace manufacturers have included lump-sum payments in labor settlements since late 1983 in lieu of general wage increases and/or cost of living adjustments. These payments are included in SIC 3721 as well as the totals for SIC 372 and for all aerospace.

[r] Revised.

AVERAGE HOURS IN THE AEROSPACE INDUSTRY

Production Workers Only
Calendar Years 1972-1985

AVERAGE WEEKLY HOURS

Year	TOTAL[a]	Aircraft (SIC 372)				Guided Missiles, Space Vehicles & Parts (SIC 376)
		TOTAL	Airframes (SIC 3721)	Engines & Parts (SIC 3724)	Other Parts & Equipment (SIC 3728)	
1972	40.2	40.0	38.9	40.9	42.2	41.9
1973	40.6	40.5	39.2	41.6	42.5	42.1
1974	40.8	40.7	39.8	41.0	42.3	41.3
1975	41.2	41.3	41.2	40.9	41.8	40.7
1976	40.9	40.9	41.2	40.2	41.3	40.5
1977	41.8	41.9	41.9	41.4	42.5	40.9
1978	42.2	42.2	42.1	41.7	43.1	41.9
1979	42.5	42.5	42.3	42.3	43.1	42.0
1980	41.9	42.0	41.8	41.8	42.6	41.0
1981	41.3	41.3	41.3	40.5	42.4	40.8
1982	41.1	41.1	40.9	40.7	41.9	40.8
1983	41.2	41.2	40.8	41.8	42.2	41.4
1984	41.9	41.9	41.2	42.2	42.7	42.0
1985	42.2	42.2	41.5	42.2	43.4	42.3

AVERAGE WEEKLY OVERTIME HOURS

Year	TOTAL[a]	Aircraft, Engines, and Parts	Guided Missiles, Space Vehicles, and Parts
1972	3.0	3.0	2.6
1973	3.2	3.3	2.7
1974	3.3	3.3	3.0
1975	3.0	3.0	3.3
1976	2.7	2.7	2.7
1977	3.5	3.5	3.2
1978	4.4	4.4	4.1
1979	4.7	4.7	4.4
1980	4.1	4.2	3.6
1981	3.5	3.5	3.2
1982	3.2	3.2	3.1
1983	3.1	3.1	3.3
1984	3.9	4.0	3.3
1985	4.5	4.5	4.6

Source: Aerospace Industries Association, derived from "Employment and Earnings" (Monthly), Bureau of Labor Statistics.

[a] TOTAL column is a weighted average based on BLS employment data.

OCCUPATIONAL INJURY AND ILLNESS INCIDENCE RATES[a] ALL MANUFACTURING AND AEROSPACE INDUSTRIES

Calendar Years 1980-1984

	1980	1981	1982	1983[r]	1984
All Manufacturing:					
Total Cases	12.2	11.5	10.2	9.7	10.2
Lost Workday Cases	5.4	5.1	4.4	4.2	4.6
Nonfatal Cases without Lost Workdays	6.8	6.4	5.8	5.5	5.7
Lost Workdays	86.7	82.0	75.0	70.4	74.2
Aircraft and Parts (SIC 372):					
Total Cases	6.8	6.2	6.0	5.0	5.5
Lost Workday Cases	2.9	2.6	2.3	1.9	2.1
Nonfatal Cases without Lost Workdays	3.8	3.6	3.6	3.0	3.4
Lost Workdays	46.9	41.7	36.9	33.0	33.6
Aircraft (SIC 3721):					
Total Cases	4.8	4.8	4.8	3.8	4.3
Lost Workday Cases	2.0	1.8	1.7	1.4	1.6
Nonfatal Cases without Lost Workdays	2.8	2.9	3.1	2.4	2.7
Lost Workdays	35.1	29.7	29.5	24.6	27.2
Aircraft Engines and Parts (SIC 3724):					
Total Cases	7.8	6.6	6.6	4.6	5.1
Lost Workday Cases	4.0	3.6	3.3	2.5	2.6
Nonfatal Cases without Lost Workdays	3.7	3.0	3.3	2.1	2.4
Lost Workdays	68.3	64.7	51.5	45.6	43.1
Aircraft Parts (SIC 3728):					
Total Cases	10.6	9.4	8.1	8.0	8.5
Lost Workday Cases	3.9	3.4	2.8	2.6	2.8
Nonfatal Cases without Lost Workdays	6.7	6.0	5.3	5.4	5.7
Lost Workdays	53.4	45.1	39.1	39.0	38.1
Guided Missiles, Space Vehicles & Parts SIC 376):					
Total Cases	3.1	2.6	2.7	2.3	2.6
Lost Workday Cases	1.4	1.2	1.2	1.1	1.1
Nonfatal Cases without Lost Workdays	1.7	1.4	1.5	1.2	1.4
Lost Workdays	21.9	19.2	19.1	19.4	20.7
Guided Missiles & Space Vehicles (SIC 3761):					
Total Cases	2.9	2.1	2.1	2.1	2.4
Lost Workday Cases	1.3	1.0	0.9	1.1	1.1
Nonfatal Cases without Lost Workdays	1.6	1.0	1.2	1.0	1.3
Lost Workdays	20.9	17.3	16.3	19.4	19.9
Space Propulsion Units & Parts (SIC 3764):					
Total Cases	3.5	4.1	3.9	2.8	3.1
Lost Workday Cases	1.8	1.9	1.9	1.3	1.4
Nonfatal Cases without Lost Workdays	1.7	2.2	1.9	1.5	1.6
Lost Workdays	23.8	25.7	28.7	19.5	23.3
Other Space Vehicle Equipment (SIC 3769):					
Total Cases	4.2	4.6	5.4	3.1	2.9
Lost Workday Cases	2.1	1.7	1.6	1.0	0.9
Nonfatal Cases without Lost Workdays	2.1	2.9	3.8	2.0	2.1
Lost Workdays	28.2	23.0	26.7	19.7	21.9

Source: Department of Labor, Bureau of Labor Statistics, "Occupational Injuries and Illnesses" (Annually).

[a] Defined as the number of injuries and illnesses per 100 full-time workers. Separate incidence rates also available for occupational injuries only.

[r] Revised.

FEDERAL CIVILIAN EMPLOYMENT[a] IN THE DEPARTMENT OF DEFENSE

Fiscal Years 1964-1987

Year	TOTAL	Civil Functions[b]	Military Functions[c]
1964	1,029,756	31,893	997,863
1965	1,004,570	29,902	974,668
1966	1,083,288	30,290	1,052,998
1967	1,225,637	31,980	1,193,657
1968	1,288,130	32,062	1,256,068
1969	1,257,091	31,214	1,225,877
1970	1,159,935	30,293	1,129,642
1971	1,092,804	30,063	1,062,741
1972	1,040,147	30,585	1,009,562
1973	987,281	29,971	957,310
1974	1,002,850	29,072	973,778
1975	983,790	29,069	954,721
1976	951,034	28,648	922,386
1977	940,549	28,912	911,637
1978	933,071	28,962	904,109
1979	914,582	28,592	885,990
1980	907,700	27,700	880,000
1981	981,400	34,400	947,000
1982	1,009,344	31,263	978,081
1983	1,015,779	30,973	984,806
1984	1,040,213	28,681	1,011,532
1985	1,065,551	28,681	1,036,870
1986[E]	1,062,923	28,548	1,034,375
1987[E]	1,065,461	28,348	1,037,113

Source: "The Budget of the United States Government" (Annually).

[a] Full-time equivalent civilian employment.

[b] Data are estimated for portions of Civil Functions.

[c] Section 904 of the 1982 Defense Authorization Act (Public Law 97-86) exempts the Department of Defense from full-time equivalent controls. Data shown are estimated civilian employment for military functions and military assistance.

[E] Estimate.

EMPLOYMENT IN NATIONAL AERONAUTICS AND SPACE ADMINISTRATION PROGRAMS

End of Fiscal Years 1960-1987

Year	TOTAL	NASA Employees	Contractor Employees[a]
1960	46,768	10,268	36,500
1961	74,577	17,077	57,500
1962	137,656	22,156	115,500
1963	246,304	27,904	218,400
1964	379,084	31,984	347,100
1965	409,900	33,200	376,700
1966	393,924	33,924	360,000
1967	306,926	33,726	273,200
1968	267,871	32,471	235,400
1969	218,345	31,745	186,600
1970	160,850	31,350	129,500
1971	143,578	29,478	114,100
1972	138,800	27,500	111,300
1973	134,850	26,850	108,000
1974	125,220	25,020	100,200
1975	127,733	24,333	103,400
1976	130,739	24,039	108,000
1977	124,136	23,636	100,500
1978	124,637	23,237	101,400
1979	131,931	22,831	109,100
1980	135,613	22,613	113,000
1981	133,473	21,873	111,600
1982	127,952	21,652	106,300
1983	129,246	22,246	107,000
1984	162,080	22,080	140,000
1985	131,993	21,993	110,000
1986[E]	154,800	21,800	133,000
1987[E]	147,800	21,800	126,000

Source: NASA Briefing on the Budget of the United States (Annually), and NASA Headquarters.

[a] Includes estimates of manpower for hardware and related contracts, as well as actual work-years for support service contracts. Increase in FY 1984 caused by change in estimating methodology to reflect more accurately the mix of support and development contractors.

[E] Estimate.

EMPLOYMENT AND COST OF R&D SCIENTISTS AND ENGINEERS ALL INDUSTRIES AND AEROSPACE INDUSTRY

1972-1985

Year	Employment[a]			Cost per R&D Scientist and Engineer[d]	
	All Industries[b] (Thousands)	Aerospace[c] (Thousands)	Aerospace as a Percent of All Industries	All Industries[b]	Aerospace[c]
1972	350.2	70.8	20.2%	$ 55,300	$ 69,200
1973	357.7	72.1	20.2	59,200	70,800
1974	360.0	70.6	19.6	63,300	76,400
1975	363.3	67.5	18.6	66,500	85,100
1976	364.4	66.9	18.4	72,200	91,300
1977	382.8	72.0	18.8	75,800	91,300
1978	404.4	82.0	20.3	80,400	89,400
1979	423.9	86.5	20.4	87,400	93,300
1980	450.6	85.9	19.1	94,900	101,600
1981	487.8	95.2	19.5	103,900	128,400
1982	509.8	91.1	17.9	112,400[r]	146,400
1983[r]	522.1	95.5	18.3	118,700	143,900
1984[r]	544.5	96.5	17.7	127,600	156,900
1985	570.3	108.4	19.0	NA	NA

Source: National Science Foundation.

[a] Employment as of January. Scientists and engineers working less than full time have been included in terms of their full time equivalent number.

[b] All manufacturing industries and those non-manufacturing industries known to conduct or finance research and development.

[c] SIC codes 372 and 376.

[d] The arithmetic mean of the numbers of R&D scientists and engineers reported for January in two consecutive years, divided into the total R&D expenditures of each industry during the earlier year.

NA Not available.

[r] Revised.

AEROSPACE INDUSTRY WORK STOPPAGES[a]

Calendar Years 1967-1985

Year[b]	Number of Strikes[c]	Number of Workers Involved	Work-Days Idle in Year
1967	22	28,800	160,800
1968	46	45,500	594,300
1969	26	76,400	1,564,600
1970	12	6,800	552,500
1971	24	17,200	465,500
1972	18	2,800	148,100
1973	13	4,500	99,100
1974	27	16,800	370,000
1975	20	22,800	1,245,600
1976	21	13,000	330,500
1977	21	46,700	1,832,200
1978	17	13,700	741,200
1979	12	6,600	103,400
1980	17	4,400	92,900
1981	12	6,100	188,900
1982	4	11,900	45,200
1983	2	8,700	404,100
1984	4	14,600	188,200
1985	4	19,700	289,800

Source: Department of Labor, Bureau of Labor Statistics, Division of Wages and Industry Relations.

[a] Based on SIC 372 of the 1967 Code, which includes missile and space propulsion units and parts and missile and space vehicle equipment not elsewhere classified, but which excludes complete guided missiles and space vehicles.

[b] Effective 1982, data not available for work stoppages involving fewer than 1,000 employees.

[c] Strikes beginning during calendar year.

In 1985, the aerospace industry recorded a net profit after taxes of $3.7 billion, an increase of $50 million over the previous year's level. Expressed in percentage terms, however—whether as a percentage of sales, assets or equity—the aerospace profit rate fell below that of 1984.

As a percentage of sales, the profit rate was 3.7 percent, down from 4.1 percent in 1984 and the 3.9 percent average for the five prior years of the decade of the 1980s. The 1985 aerospace profit rate matched exactly that of the U.S. manufacturing corporations in general and was higher than the 3.4 percent rate posted by manufacturers of durable goods.

Measured as a percentage of assets, the aerospace rate was 4.3 percent, down from 4.7 percent in 1984; the average for all manufacturing companies was 4.6 percent. As a percentage of equity, the aerospace profit amounted to 13.8 percent, down from 1984's 14.1 percent; the 1985 all-manufacturing average was 10 percent.

The aerospace balance sheet for 1985 showed an increase over 1984 in total assets, up $6.9 billion to $87 billion. Net working capital dipped to $8.7 billion, down from $9.7 billion in 1984.

Aerospace expenditures for new plant and equipment amounted to $3.5 billion in 1985, close to the $3.6 billion spent in the previous year. Estimated plant and equipment outlays for 1986 are $3.6 billion.

In terms of contract dollar value, McDonnell Douglas Corporation again topped the list of companies awarded Department of Defense contracts in Fiscal Year 1985; McDonnell Douglas had led in 1984 and placed second in 1983. In FY 1985, the company received contracts valued at $8.9 billion. General Dynamics Corporation, in third place a year earlier, moved up to second with awards totaling $7.4 billion. Rockwell International Corporation, second in 1984, was third in 1985 with $6.3 billion.

Rounding out the top 10 were General Electric Company ($5.9 billion); The Boeing Company ($5.5 billion); Lockheed Corporation ($5.1 billion); United Technologies Corporation ($3.9 billion); Hughes Aircraft Company ($3.6 billion); Raytheon Company ($3.0

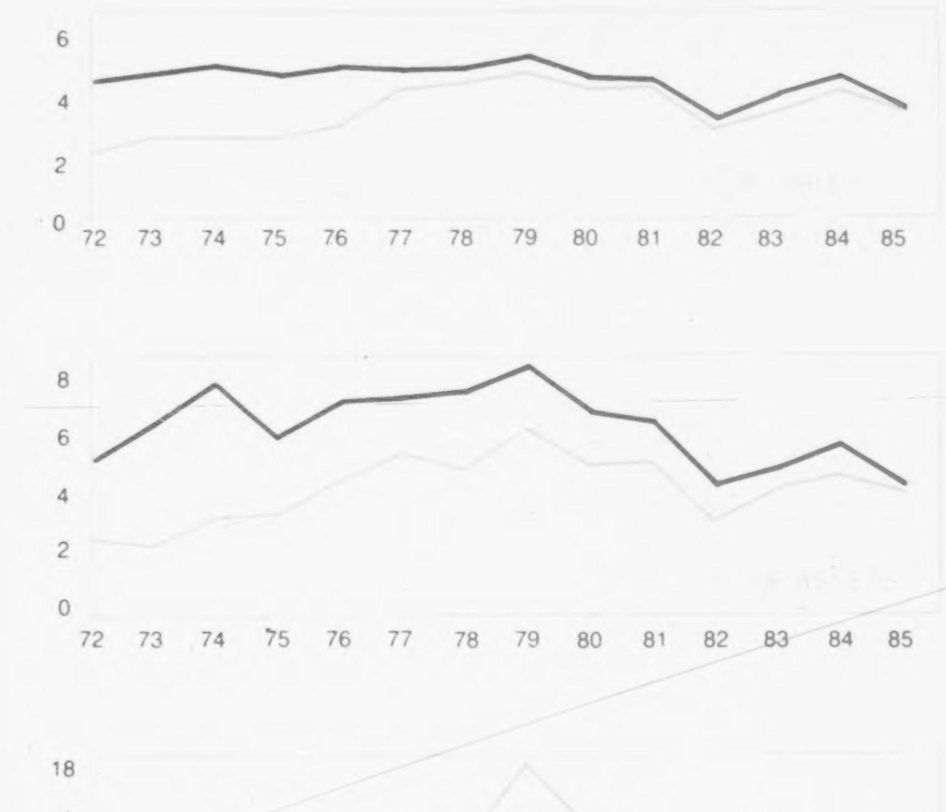
Finance

86 87

billion); Grumman Corporation and Marietta Corporation, tied for 10th place at $2.7 billion. The latter two companies were just outside the top 10 in 1984; all the others ranked among the leaders in the previous year.

As it has every year since the Space Shuttle program began, Rockwell International Corporation, Shuttle prime contractor, was first among NASA contractors with FY 1985 awards totaling $1.3 billion. Lockheed Space Operations Company, which handles management of Shuttle processing operations, was second with $551 million. In third and fourth places were two other Shuttle program contractors: Martin Marietta Corporation ($483 million), builder of the External Tank, and Morton Thikol, Inc. ($334 billion), Solid Rocket Booster manufacturer. The rest of the NASA top 10 included General Dynamics Corporation ($300 million); United Space Boosters, Inc. ($207 million); McDonnell Douglas Coroporation ($194 million); Allied Bendix-Aerospace ($150 million); Lockheed Missiles & Space Company ($137 million); and Lockheed Engineering & Management Company ($125 million).□

NET PROFIT AFTER TAXES



Source Aerospace Industries Association

NET PROFIT AFTER TAXES AS A PERCENT OF SALES, ASSETS, AND EQUITY FOR ALL MANUFACTURING CORPORATIONS AND THE AEROSPACE INDUSTRY[a]

Calendar Years 1971-1985

PERCENT OF SALES

Year	All Manufacturing Corporations	Non-Durable Goods	Durable Goods	Aerospace Industry
1971	4.1%	4.5%	3.8%	1.8%
1972	4.4	4.6	4.3	2.4
1973	4.7	5.0	4.5	2.9
1974	5.5	6.4	4.7	2.9
1975	4.6	5.1	4.1	2.9
1976	5.4	5.5	5.2	3.4
1977	5.3	5.3	5.3	4.2
1978	5.4	5.4	5.5	4.4
1979	5.7	6.1	5.2	5.0
1980	4.8	5.6	4.0	4.3
1981	4.7	5.1	4.3	4.4
1982	3.5	4.6	2.4	3.3
1983	4.1	4.9	3.1	3.5
1984	4.7[r]	4.8	4.4	4.1
1985	3.7	4.1	3.4	3.7

PERCENT OF ASSETS[b] AND EQUITY[b]

Year	Percent of Assets		Percent of Equity	
	All Manufacturing	Aerospace Industry	All Manufacturing	Aerospace Industry
1971	5.1%	2.0%	9.7%	5.8%
1972	5.5	2.7	11.1	8.6
1973	6.5	2.4	12.8	10.3
1974	8.0	3.7	14.9	10.4
1975	6.2	3.8	11.6	11.0
1976	7.5	4.7	14.0	12.8
1977	7.6	5.7	14.2	14.9
1978	7.8	5.5	15.0	15.7
1979	8.4	6.3	16.5	18.4
1980	6.9	5.2	13.9	16.0
1981	6.7	5.2	13.6	15.9
1982	4.5	3.7	9.2	12.0
1983	5.2	4.1	10.6	12.2
1984	5.9	4.7	12.5[r]	14.1
1985	4.6	4.3	10.0	13.8

Source: Bureau of the Census, "Quarterly Financial Report for Manufacturing, Mining and Trade Corporations."

[a] Based on a sample of corporate entities classified in SIC codes 372 and 376, having as their principal activity the manufacture of aircraft, guided missiles, space vehicles, and propulsion and parts.

[b] Average of four quarters.

[r] Revised.

INCOME STATEMENT AND OPERATING RATIOS FOR AEROSPACE COMPANIES[a]

Calendar Years 1982-1985
(Millions of Dollars)

INCOME STATEMENT	1982	1983	1984[r]	1985
Net Sales, Receipts, Operating Revenues	$66,198	$81,441	$88,728	$99,184
Less: Depreciation, Depletion & Amortization of Property, Plant and Equipment	1,689	2,203	2,502	2,826
Less: All Other Operating Costs & Expenses, Including Selling Costs & General & Administrative Expenses	61,421	75,044	80,695	91,603
Income (or Loss) from Operations	$ 3,090	$ 4,193	$ 5,531	4,754
Net Non-Operating Income (Expense)	183	429	37	1,139
Income (or Loss) before Income Taxes (= Total Income)	$ 3,272	$ 4,622	$ 5,567	$ 5,896
Less: Provision for Current & Deferred Domestic Income Taxes	1,081	1,791	1,928	2,206
Income (or Loss) after Income Taxes (= Net Profit)	$ 2,193	$ 2,829	$ 3,639	$ 3,689
Cash Dividends Charged to Retained Earnings	841	985	1,124	1,606
Net Income Retained in Business	$ 1,350	$ 1,845	$ 2,516	$ 2,083
Retained Earnings at Beginning of Year[b]	12,508	15,479	17,705	19,279
Adjustments to Retained Earnings[c]	(160)	75	31	(503)
Retained Earnings at End of Year[d]	$13,700	$17,398	$20,252	$20,859
OPERATING RATIOS				
Income before Taxes as Percent of Net Sales	4.9%	5.7%	6.3%	5.9%
Provision for Current & Deferred Domestic Income Taxes as Percent of Income before Taxes (Total Income)	33.0	38.7	34.6	37.4
Income after Taxes (Net Profit) as Percent of Net Sales	3.3	3.5	4.1	3.7
Income after Taxes (Net Profit) as Percent of Stockholders' Equity[e]	12.0	12.2	14.1	13.8
Income after Taxes (Net Profit) as Percent of Total Assets[e]	3.7	4.1	4.7	4.3

Source: Bureau of the Census, "Quarterly Financial Report for Manufacturing, Mining, and Trade Corporations."

NOTE: Detail may not add to totals because of rounding.

[a] Based on sample of corporate entities classified in SIC codes 372 and 376, having as their principal activity the manufacture of aircraft, guided missiles, space vehicles, and propulsion and parts.

[b] Beginning-of-year retained earnings for any particular year do not equal end-of-year retained earnings for the previous year because of rotation of small companies in survey sample.

[c] Other direct credits (or charges) to retained earnings (net), including stock and other non-cash dividends, etc.

[d] Retained Earnings at End of Year CALCULATED AS Retained Earnings at Beginning of Year PLUS Income (Loss) after Income Taxes MINUS Cash Dividends Charged to Retained Earnings PLUS Adjustments to Retained Earnings.

[r] During the first quarter of 1985, a considerable number of companies were reclassified by industry. To provide comparability, data for 1984 have been restated to reflect these reclassifications.

[e] Average of four quarters.

BALANCE SHEET FOR AEROSPACE COMPANIES[a]

December 31, 1982-1985
(Millions of Dollars)

	1982	1983	1984[r]	1985
Assets:				
Current Assets				
Cash	$ 891	$ 2,070	$ 2,184	$ 4,372
Securities, Com'l Paper & Other Short-term Financial Investments	1,317	2,716	2,904	940
Total Cash and U.S. Gov't and Other Securities	$ 2,208	$ 4,786	$ 5,089	$ 5,312
Receivables (Total)	6,305	8,661	10,165	11,611
Inventories (Gross)	31,006	31,716	37,569	38,125
Other Current Assets	639	821	1,266	1,181
Total Current Assets	$40,159	$45,983	$54,088	$56,229
Net Plant, Property & Equipment	12,229	14,613	15,773	17,579
Other Non-Current Assets	7,041	9,421	10,235	13,178
Total Assets	$59,428	$70,017	$80,096	$86,986
Liabilities:				
Current Liabilities				
Short Term Loans	$ 1,174	$ 899	$ 1,680	1,961
Trade Accts. & Notes Payable	5,859	5,884	6,672	7,424
Income Taxes Accrued	2,771	3,426	4,378	5,021
Installments Due on Long Term Debts	344	421	614	488
Other Current Liabilities	22,157	25,633	31,014	32,611
Total Current Liabilities	$32,307	$36,264	$44,359	$47,505
Long Term Debt	5,822	5,206	4,818	6,430
Other Non-Current Liabilities	2,896	4,157	4,302	5,339
Total Liabilities	$41,025	$45,627	$53,478	$59,273
Stockholders' Equity:				
Capital Stock	$ 4,704	$ 6,993	$ 6,366	$ 6,854
Retained Earnings	13,700	17,398	20,252	20,859
Total Stockholders' Equity	$18,404	$24,391	$26,618	$27,713
Total Liabilities & Stockholders' Equity	$59,428	$70,017	$80,096	$86,986
Net Working Capital	$ 7,852	$ 9,719	$ 9,730	$ 8,724

Source: Bureau of the Census, "Quarterly Financial Report for Manufacturing, Mining and Trade Corporations."

NOTE: Detail may not add to totals because of rounding.

[a] Based on sample of corporate entities classified in SIC codes 372 and 376, having as their principal activity the manufacture of aircraft, guided missiles, space vehicles and propulsion and parts.

[r] During the first quarter of 1985, a considerable number of companies were reclassified by industry. To provide comparability, the data for 1984 have been restated to reflect these reclassifications.

NEW PLANT AND EQUIPMENT EXPENDITURES

Calendar Years 1962-1986
(Billions of Dollars)

Year	All Industries	All Manufacturing Industries	Durable Goods	Aerospace[a]	
				Current Dollars	Constant Dollars 1982 = 100[b]
1962	$ 40.86	$ 16.03	$ 7.81	$0.40	$1.20
1963	43.67	17.27	8.64	0.44	1.31
1964	51.26	21.23	10.98	0.41	1.23
1965	59.52	25.41	13.49	0.53	1.58
1966	70.40	31.37	17.23	1.17	3.38
1967	72.75	32.25	17.83	1.25	3.50
1968	76.42	32.34	17.93	1.23	3.29
1969	85.74	36.27	19.97	1.29	3.30
1970	91.91	36.99	19.80	0.88	2.17
1971	92.91	33.60	16.78	0.63	1.48
1972	103.40	35.42	18.22	0.68	1.57
1973	120.03	42.35	22.63	0.79	1.77
1974	139.67	52.48	26.77	1.21	2.46
1975	142.42	53.66	25.37	1.19	2.12
1976	158.44	58.53	27.50	1.02	1.70
1977	184.82	67.48	32.77	1.14	1.77
1978	217.76	78.58	39.46	1.76	2.50
1979	254.96	95.92	48.50	2.70	3.49
1980	282.80	112.33	55.36	3.57	4.25
1981	315.22	126.54	59.81	3.36	3.62
1982	310.58	120.68	55.35	3.41	3.41
1983	304.78	116.20	53.08	2.91	3.06
1984[r]	354.44	138.82	66.24	3.57	3.79
1985	386.41	153.15	73.14	3.46	3.65
1986[E]	395.13	151.84	70.99	3.55	3.45

Source: U.S. Department of Commerce, Bureau of Economic Analysis (BEA), Quarterly Report.

[a] Data are company-based (not establishment- or product-based), and represent corporate entities whose principal activity falls in SIC Codes 372 and 376.

[b] Aerospace constant dollars based on BEA's industry deflator for historical data, and Durable Goods deflator for current year estimates.

[E] Estimate.

[r] Revised.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MAJOR CONTRACTORS

Fiscal Years 1981-1985

By rank according to net value of NASA prime contracts awarded during last fiscal year (Millions of Dollars)

Company	1981	1982	1983	1984	1985
TOTAL PROCUREMENTS	$5,408	$5,884	$6,797	$7,354	$8,298
Awards to Business Firms	4,273	4,806	5,586	5,967	6,653
% of TOTAL PROCUREMENTS	79%	82%	82%	81%	80%
Rockwell International Corp.	$1,471	$1,564	$1,568	$1,402	$1,345
Lockheed Space Operations Co.	*(a)*	*(a)*	19	301	551
Martin Marietta Corp.	261	310	466	428	483
Morton Thiokol Inc.	105	152	268	322	334
General Dynamics Corp.	66	114	156	253	300
United Space Boosters Inc.	65	127	115	197	207
McDonnell Douglas Corp.	198	220	237	200	194
Allied Bendix Aerospace	103	109	137	163	150
Lockheed Missles & Space Co.	43	69	96	102	137
Lockheed Engrg. & Mgmt. Co. Inc.	61	89	101	105	125
IBM Corp.	95	107	116	134	124
Ford Aerospace & Communications	62	74	107	106	120
United Technologies Corp.	71	90	116	118	110
EG&G Florida Inc.	*(a)*	*(a)*	68	109	108
TRW Inc.	37	44	49	82	103
Computer Sciences Corp.	129	138	147	89	102
RCA Corp	27	24	57	68	102
Space Communications Co.	*(a)*	*(a)*	*(a)*	*(a)*	98
Boeing Co.	40	41	44	44	69
Planning Research Corp.	44	55	57	57	65
Perkin Elmer Corp.	51	44	70	79	64
Pan American World Serv. Inc.	34	35	36	40	49
Teledyne Industries Inc.	23	29	47	52	46
General Electric Co.	104	97	85	44	43
Singer Co.	30	33	35	44	43
Boeing Technical Operat. Inc.	81	82	86	25	39
Northrop Services Inc.	24	25	29	32	39
Hughes Aircraft Co.	53	40	51	42	38
Lockheed Corp.	16	7	9	18	30
Ball Corp.	30	26	39	39	30

Source: National Aeronautics and Space Administration, "NASA Annual Procurement Report," (Annually)

a Not in list of major contractors for indicated year(s).

DEPARTMENT OF DEFENSE MAJOR CONTRACTORS

Fiscal Years 1981-1985
Listed by rank according to net value of prime contracts awarded during last fiscal year[a]
(Millions of Dollars)

Company	1981	1982	1983	1984	1985
TOTAL CONTRACTS	$97,389	$116,660	$128,242	$133,571	$150,674
McDonnell Douglas Corp.	$ 4,409	$ 5,630	$ 6,143	$ 7,684	$ 8,857
General Dynamics Corp.	3,402	5,891	6,818	5,952	7,440
Rockwell International Corp.	1,126	2,691	4,545	6,219	6,264
General Electric Co.	3,018	3,654	4,518	4,514	5,891
Boeing Co.	2,683	3,239	4,423	4,654	5,458
Lockheed Corp.	2,657	3,499	4,006	4,967	5,082
United Technologies Corp.	3,776	4,208	3,867	3,207	3,906
Hughes Aircraft Co.	2,552	3,141	3,240	3,231	3,551
Raytheon Co.	1,826	2,262	2,728	3,093	2,999
Grumman Corp.	1,710	1,900	2,298	2,419	2,733
Martin Marietta Corp.	1,287	2,008	2,272	2,261	2,717
Westinghouse Electric Corp.	1,125	1,492	1,778	1,944	1,941
Textron Inc.	479	584	672	805	1,920
Honeywell Inc.	838	1,217	1,114	1,354	1,908
IBM Corp.	805	1,197	1,421	1,572	1,783
Sperry Corp.	928	1,149	1,133	1,615	1,628
General Motors Corp.	622	690	893	1,019	1,614
LTV Corp.	548	548	1,343	1,655	1,585
Litton Industries Inc.	1,385	1,317	2,169	2,441	1,528
ITT Corp.	380	443	603	1,140	1,503
Texas Instruments Inc.	479	584	467	956	1,426
Allied Signal Corp.[b]	458	592	778	759	1,348
RCA Corp.	877	996	1,181	1,116	1,315
Tenneco Inc.	1,151	845	3,762	749	1,250
Northrop Corp.	623	1,598	847	882	1,195
Ogden Corp.	(*c*)	(*c*)	293	587	1,156
TRW Inc.	517	869	1,137	983	1,079
Ford Motor Co.	544	897	1,072	1,124	1,019
Eaton Corp.	(*c*)	337	442	1,117	923
Royal Dutch Shell Group	228	327	336	269	893

Source: Department of Defense, "100 Companies Receiving the Largest Dollar Volume of Prime Contract Awards," (Annually).

[a] Effective 1980, data include DOD contract awards for civil functions, while data for prior years were limited to military prime contract awards.

[b] For 1980-1982, data represent Bendix Corporation.

[c] Not in top 100 companies for indicated year(s).

DEPARTMENT OF DEFENSE PRIME CONTRACT AWARDS OVER \$25,000[a] FOR SELECTED MAJOR MILITARY HARD GOODS

By Geographic Region

Fiscal Years 1983, 1984, 1985

Program and Region	Millions of Dollars			Percent of Program Total		
	1983	1984	1985	1983	1984	1985
AIRCRAFT—TOTAL	$27,997	$31,796	$38,449	100.0%	100.0%	100.0%
New England	3,812	4,324	4,633	13.6	13.6	12.0
Middle Atlantic	3,685	3,758	4,577	13.2	11.8	11.9
East North Central	1,941	2,277	4,105	6.9	7.2	10.7
West North Central	5,206	5,595	6,737	18.6	17.6	17.5
South Atlantic	3,372	3,471	4,461	12.0	10.9	11.6
East South Central	272	337	455	1.0	1.1	1.2
West South Central	3,048	3,330	4,118	10.9	10.5	10.7
Mountain	311	395	564	1.1	1.2	1.5
Pacific[b]	6,350	8,309	8,801	22.7	26.1	22.9
MISSILE & SPACE SYSTEMS—TOTAL	$16,009	$18,385	$20,475	100.0%	100.0%	100.0%
New England	2,070	2,795	3,158	12.9	15.2	15.4
Middle Atlantic	682	842	1,090	4.3	4.6	5.3
East North Central	294	270	166	1.8	1.5	0.8
West North Central	845	1,135	1,306	5.3	6.2	6.4
South Atlantic	2,055	1,920	2,072	12.8	10.4	10.1
East South Central	277	239	317	1.7	1.3	1.6
West South Central	935	1,323	1,570	5.8	7.2	7.7
Mountain	1,340	1,664	1,973	8.4	9.0	9.6
Pacific[b]	7,511	8,196	8,824	46.9	44.6	43.1
ELECTRONICS & COMMUNICATIONS EQUIPMENT—TOTAL	$18,905	$21,388	$23,161	100.0%	100.0%	100.0%
New England	2,091	2,091	1,988	11.1	9.8	8.6
Middle Atlantic	3,494	4,520	5,242	18.5	21.1	22.6
East North Central	796	1,118	1,608	4.2	5.2	6.9
West North Central	942	1,977	1,623	5.0	9.2	7.0
South Atlantic	3,536	4,142	4,841	18.7	19.4	20.9
East South Central	115	129	153	0.6	0.6	0.7
West South Central	1,095	886	1,272	5.8	4.1	5.5
Mountain	560	759	842	3.0	3.5	3.6
Pacific[b]	6,276	5,766	5,592	33.2	27.0	24.1

Source: Department of Defense, "Prime Contract Awards by Region and State" (Annually).

NOTE: Detail may not add to totals because of rounding.

[a] Data represent prime contract awards over \$25,000, effective 1983, and over \$10,000 for previous years.

[b] Includes Alaska and Hawaii.

Aeronautics: the science that treats of the operation of aircraft, also, the art or science of operating aircraft.

AIA: Aerospace Industries Association of America, Inc., formerly Aircraft Industries Association.

Aerospace Industry: the industry engaged in research, development and manufacture of aerospace systems, including manned and unmanned aircraft; missiles, space launch vehicles, and spacecraft; propulsion, guidance and control units for all of the foregoing; and a variety of airborne and ground based equipment essential to the test, operation, and maintenance of flight vehicles.

Aerospace Employment: annual average calculated as one-twelfth of sum of monthly estimates of total number of persons employed during a designated pay period by the aircraft and missile and space industries (SIC 372 and 376) plus estimated aerospace-related employment in the communications equipment (SIC 3662) and instruments (SIC 381 and 382) industries and in certain other industries (SIC 28, 35, 73, 89, etc.).

Aerospace Payroll: estimated on the basis of average weekly earnings for a given calendar year for production workers plus an estimated annual salary for other employees.

Aerospace Sales: the AIA estimate of aerospace industry sales, developed by summing DOD expenditures for aircraft, missiles, and space-related procurement and RDT&E; NASA expenditures for research and development, and space flight control and data communications; outlays for space activities by other U.S. Government departments and agencies; commercial sales of space-related products; net domestic and export sales of civil aircraft, engines, and parts; FMS and commercial exports of military aircraft, missiles, propulsion, and related parts; and sales of related products and services, including electronics, software, and ground support equipment, plus sales of non-aerospace products which are produced in aerospace-manufacturing establishments and which use technology, processes, and materials derived from the aerospace industry. See also Related Products and Services.

Air Carriers: the commercial system of air transportation, consisting of domestic and international scheduled and charter service.

Aircraft: all airborne vehicles supported either by buoyancy or by dynamic action. Used in this volume in a restricted sense to mean an airplane—any winged aircraft, including helicopters but excluding gliders and guided missiles.

Aircraft Agreement (Agreement on Trade in Civil Aircraft): negotiated in the Tokyo Round of the Multilateral Trade Negotiations, and implemented January 1, 1980, providing for elimination of tariff and non-tariff trade barriers in the civil aircraft sector.

Aircraft Industry: the industry primarily engaged in the manufacture of aircraft, aircraft engines and parts, aircraft propellers and parts, and aircraft parts and auxiliary equipment. A sector of the **Aerospace Industry.**

Airframe: the structural components of an airplane, such as fuselage, empennage, wings, landing gear, and engine mounts, but excluding such items as engines, accessories, electronics and other parts that may be replaced from time to time.

Airlines: see **Air Carriers.**

Appropriation (Federal Budget): an act of Congress authorizing an agency to incur obligations and make payments out of funds held by the Department of the Treasury.

Assets, Net: the sum of all recorded assets after reducing such amount by allowance of reserve for bad debts, depreciation and amortization, but before deducting any liabilities, mortgages or other indebtedness.

Astronautics: the art and science of designing, building and operating manned or unmanned space objects.

Average Weekly Hours: average hours for which pay was received; different from standard or scheduled hours.

Glossary

Avionics: Communications, navigation, flight controls, and displays.

Backlog: the sales value of orders accepted (supported by legal documents) that have not yet passed through the sales account.

Budget Authority: authority provided by the Congress; mainly in the form of **Appropriations,** which allows Federal agencies to incur obligations to spend or lend money.

Bureau of the Census: an agency of the Department of Commerce.

Bureau of Economic Analysis (BEA): an agency of the Department of Commerce.

Bureau of Labor Statistics (BLS): an agency of the Department of Labor.

Constant Dollars, see **Deflator.**

Deflator: index used to convert a price level to one comparable with the price level at a different time, offsetting the effect of inflation. The base period, which equals 100, is usually specified as either a given fiscal or calendar year. **Constant Dollars** are calculated by dividing current ('then-year') dollars by appropriate price deflator, and multiplying by 100.

Depreciation: the general conversion of the depreciable cost of a fixed asset into expense, spread over its remaining life. There are a number of methods, all based on a periodic charge to an expense account and a corresponding credit to a reserve account.

Development: the process or activity of working out a basic design, idea or piece of equipment (see **Research).**

DOD: Department of Defense.

DOE: Department of Energy.

DOT: Department of Transportation.

Durable Goods Industry: comprised of major manufacturing industry groups with SIC Codes 24, 25, and 32-39. All major manufacturing industry groups in SIC Codes 20-23 and 26-31 are considered non-durable goods manufacturing industry groups.

Earnings: the actual return to the worker for a stated period of time. Irregular bonuses, retroactive items, payments of various welfare benefits, and payroll taxes paid by employers are excluded.

Average Hourly Earnings: on a "gross" basis, reflecting not only changes in basic hourly and incentive wage rates, but also such variable factors as premium pay for overtime and late shift work, and changes in output of workers paid for an incentive plan.

Average Weekly Earnings: derived by multiplying average weekly hours by hourly earnings.

ERDA: Energy, Research and Development Administration. ERDA was formed in 1974 to bring together activities previously scattered among several agencies. The major elements covered were nuclear energy, fossil energy, solar and geothermal energy, conservation through increased efficiency and environmental controls. Most of these functions were assumed by the Department of Energy as of October 1, 1977.

Establishment: the basis for reporting to the Census of Manufacturers; an operating facility in a single location.

Evaluation: (Department of Defense): determination of technical suitability of material, equipment or a system; see **RDT&E.**

Expenditures (Federal Budget): see **Outlays.**

Exports: domestic merchandise including commodities which are grown, produced, or manufactured in the United States, and commodities of foreign origin which have been changed in the United States from the form in which they were imported, or which have been enhanced in value by further manufacture in the United States, and which are traded or sold to other nations.

Export-Import Bank of the United States (Eximbank): created in 1934, and established as an independent U.S. Government Agency in 1945, Eximbank is designed ". . . to aid in financing and to facilitate exports . . ." Eximbank receives no appropriations from the U.S. Congress. It is directed by statute to (1) offer financing that is competitive with that offered exporters of other countries by their official export credit institutions, (2) determine that the transactions supported provide for a reasonable assurance of repayment, (3) supplement, but not compete with private sources of export financing, and (4) take into account the effect of its activities on small business, the domestic economy, and U.S. employment.

FAA: Federal Aviation Administration (formerly the Federal Aviation Agency), an agency of the Department of Transportation.

Facility: a physical plant or installation including real property, building, structures, improvements and plant equipment.

Fiscal Year (Federal Budget): until June 30, 1976, year beginning July 1 and ending June 30, and designated by the year in which it ends. Beginning October 1, 1976, the fiscal years run from October 1 through September 30 and are designated by the year in which they end. A three month **Transition Quarter** from July 1 through September 30, 1976, belongs to neither fiscal year.

Flyaway Value: includes the cost of the airframe, engines, electronics, communications, armament and other installed equipment.

Foreign Military Sales (FMS): export sales to foreign governments arranged through the Department of Defense, whereby DOD recovers full purchase price and administrative costs; often mistakenly used to include foreign military aid and foreign commercial sales as well.

FY: see **Fiscal Year.**

General Agreement on Tariff and Trade (GATT): a multilateral treaty, subscribed to by over 80 governments which together account for more than four-fifths of world trade; its aim is to liberalize world trade; the only multilateral instrument that lays down agreed rules for international trade.

General Aviation: all civil flying except that of air carriers.

GNP (Gross National Product): the market value of the total output of goods and services produced by the nation's economy before deduction of depreciation charges and other allowances for business and institutional consumption of durable goods. It includes the purchase of goods and services by consumers and government, gross private domestic investment and net exports.

Helicopter: a rotary-wing aircraft which depends principally for its support and motion in the air upon the lift generated by one or more power-driven rotors, rotating on substantially vertical axes. A helicopter is a **V/STOL.**

Heliport: an area, either at ground level or elevated on a structure, that is used for the landing and take-off of **helicopters** and includes some or all of the various facilities useful to helicopter operations such as helicopter parking, hangar, waiting room, fueling and maintenance equipment.

Helistop: a minimum facility **heliport,** either at ground level or elevated on a structure for the landing and takeoff of **helicopters** but without such auxiliary facilities as waiting room, hangar parking, etc.

ICBM: Intercontinental Ballistic Missile, with a range of more than 5,000 miles.

Imports: classified as "general imports" or "imports for consumption." This volume refers generally to "imports for consumption," which are entries for immediate consumption plus merchandise withdrawn from bonded storage warehouses for consumption. Data are compiled from Import Entries filed with U.S. Customs officials, and are in general based on the market value or price in the foreign country at the time of exportation of such merchandise, including the cost of containers and coverings, as well as other charges and expenses incidental to placing the merchandise in condition, packed and ready for shipment to the United States, but excluding import duties, insurance, freight and other charges incidental to arrival of the goods in the United States. The foreign values of imported merchandise are converted into U.S. currency at the rate of exchange prevailing on the day the merchandise is shipped to the United States.

Income:

Net Operating Income: total net sales (see **Sales**) less total operating costs.

Net Income (Before Income Taxes): Net Operating Income plus or minus **"Other Income and Expenses."**

Other Income and Expenses: includes interest income, royalty income, capital gains and losses, interest expense, cash discounts, etc.

Net Income (After Income Taxes): Net Income (Before Taxes) less federal income taxes.

Lump-Sum Wage Payment: a one time payment given in lieu of general wage increases and/or cost of living adjustments in labor settlements.

Manufacturing Industries: those **establishments** engaged in the mechanical or chemical transformation of inorganic or organic substances into new products, and usually described as plants, factories, or mills, which characteristically use power-driven machines and materials-handling equipment; also establishments engaged in assembling component parts of manufactured products if the new product is neither a structure nor other fixed improvement.

Merchandise Trade Balance: the difference between the value of U.S. goods exported to other countries and foreign goods imported into this country. The trade balance is generally regarded as "favorable" when **exports** exceed **imports**—a trade surplus—and "unfavorable" when **imports** exceed **exports**—a trade deficit.

Missile: sometimes applied to space launch vehicles, but more properly connotes automated weapons of warfare, i.e., a weapon which has an integral system of guidance, as opposed to the unguided rocket.

Multilateral Trade Negotiations (MTN): a forum within the **GATT** in which countries negotiate to overcome their trade problems. In September 1973, in Tokyo, over 100 nations launched new multilateral trade negotiations, called the "Tokyo Round," covering both tariff and non-tariff barriers to trade in industrial and agricultural products, and improvements in the **GATT** itself.

NASA: National Aeronautics and Space Administration.

NATO: North Atlantic Treaty Organization.

New Obligational Authority (Federal Budget): see **Budget Authority.**

Non-Aerospace Products and Services: products and services other than aircraft, missiles, space vehicles, and related propulsion and parts, produced or performed by establishments whose principal business is the development and/or manufacture of aerospace products.

OASD: Office of the Assistant Secretary of Defense.

Obligations (Federal Budget): commitments made by Federal agencies to pay out money for products, services or other purposes—as distinct from the actual payments. Obligations incurred may not be larger than **budget authority.**

Orders, Net New: the sales value of new orders (supported by legal documents) minus cancellations during the period.

Other Aerospace Products and Services: all conversions, modifications, site activation, and other aerospace products (including drones) and services, plus research and development under contract, defined as basic and applied research in the sciences and in engineering, and design and development of prototype products and processes.

Outlays: checks issued, interest accrued on the public debt, or other payments made, net of refunds and reimbursements.

Overtime Hours: that portion of the gross average weekly hours which was in excess of regular hours and for which premium payments were made.

Payroll, All Manufacturing: includes the gross earning paid in the calendar year to all employees on the payroll of operating manufacturing **establishments.** Includes all forms of compensation paid directly to workers such as salaries, wages, commissions, dismissal pay, all bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees' Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. Does not include employers' Social Security contributions or other non-payroll labor costs such as employees' pension plans, group insurance premiums, and workmen's compensation.

Passenger-Mile: one passenger moved one mile.

Procurement: the process whereby the executive agencies of the Federal Government acquire goods and services from enterprises other than the Federal Government.

Production Workers: includes working foremen and all non-supervisory workers (including leadmen and trainees) engaged in fabricating, processing, assembling, inspection, receiving, storage, handling, janitorial services, product development, auxiliary production for plant's own use and record keeping and services closely associated with the above production operations.

R&D: Research and Development.

Research: systematic study directed toward fuller scientific knowledge or understanding of the subject studied. Research is classified as either **basic** or **applied** according to the objectives of the sponsoring agency.

Basic Research: with the objective of gaining fuller knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications toward processes or products in mind.

Applied Research: with the objective of gaining knowledge or understanding necessary for determining the means by which a recognized and specific need may be met.

Development: the systematic use of scientific knowledge directed toward the production of useful materials, devices, systems, or methods including design and development of prototype and processes.

Independent Research and Development (IR&D): a term devised by the Department of Defense and used by Federal agencies to differentiate between a contractor's research and development technical effort performed under a contract, grant, or other arrangement (R&D) and that which is self-initiated and self-funded (IR&D).

Industrial Research and Development: research and development work performed within company facilities, funded by company or Federal funds, and excluding company-financed research and development contracted to outside organizations such as research institutions, universities and colleges, or other non-profit organizations.

RDT&E: (Department of Defense): Research, Development, Test and Evaluation.

Related Products and Services: Sales of electronics, software, and ground equipment in support of aerospace products, plus sales by aerospace manufacturing establishments of systems and equipment which are generally derived from the industry's aerospace technological expertise in design, materials, and processes, but which are intended for applications other than flight.

Research: see **R&D.**

Rotorcraft: an aircraft which in all its usual flight attitudes is supported in the air wholly or in part by a rotor or rotors, *i.e.*, airfoils rotating or revolving about an axis (see **Helicopter**).

Sales: net of returns, allowances, and discounts, the dollar value of shipments, including dealer's commission, if any, which have passed through the sales account.

Satellite: a body that revolves around a larger body, such as the moon revolving around the earth, or a man-made object revolving about any body such as the sun, earth, or moon.

(CONTINUED) Glossary

SIC (Standard Industrial Classification): a system developed by the U.S. Government to define the industrial composition of the economy, facilitating comparability of statistics. See **Aerospace Industry** for explanation of SIC codes applicable to the aerospace industry.

Space Vehicle: an artificial body operating in outer space (beyond the earth's atmosphere).

Stockholder's Equity: assets minus all obligations of the corporation, except those to stockholders. Annual data are average equity for the year (using four end-of-quarter figures.) For details, see "Quarterly Financial Report for Manufacturing, Mining and Trade Corporations," compiled by the Bureau of the Census.

STOL: short take-off and landing aircraft.

Test (Department of Defense): an experiment designed to assess progress in attainment or accomplishment of development objectives (see **RDT&E).**

Thrust: the driving force exerted by an engine, particularly an aircraft or missile engine, in propelling the vehicle to which it is attached.

Ton-Mile: one ton moved one mile.

Total Obligational Authority: the sum of **budget authority** granted or requested from the Congress in a given year, plus unused **budget authority** from prior years.

Trade Balance: see **Merchandise Trade Balance.**

Transition Quarter (Tr. Qtr.): the three-month interval from July 1, 1976 to September 30, 1976. See **Fiscal Year.**

Turbine, Turbo: a mechanical device or engine that spins in reaction to a fluid flow that passes through or over it. Frequently used in "turboprop" or "turbojet."

U.K.: United Kingdom.

U.S.: United States of America.

USA: United States Army, an agency of the U.S. Department of Defense.

USAF: United States Air Force, an agency of the U.S. Department of Defense.

USN: United States Navy, an agency of the U.S. Department of Defense.

USSR: Union of Soviet Socialist Republics.

Utility Aircraft: an aircraft designed for general purpose flying.

V/STOL: vertical short take-off and/or landing aircraft.

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  - Aerospace Group
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  - Aircraft Division
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- General Electric Company
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  - Allison Gas Turbine Division
  - Hughes Aircraft Co.
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  - Aerospace & Defense Group
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- IC Industries, Inc.
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